EG&G Idaho, Inc.

FORM EGG-2631#

(Rev. 01-92)

Project File Number OU 4-12

EDF Serial Number ER-WAG4-59

Functional File Number N/A

ENGINEERING DESIGN FILE

Project/Task OU 4-12 RI/FS

Subtask Source Term Investigation

TITLE: CFA Landfills I, II and III; Disposal of Waste Oil

SUMMARY

The summary briefly defines the problem or activity to be addressed in the EDF, gives a summary of the activities performed in addressing the problem and states the conclusions, recommendations, or results arrived at from this task.

Attachments 1 through 15 contain information compiled during the OU 4-12 RI/FS. The information consists of letters, reports and personnel interviews related to disposal of waste oil and sludge to the landfills.

Attachment 1:
Subject: Letter on waste oil disposal procedures-waste oil to be used for dust suppression on roads and weed control in borrow pits.
Date: October 2, 1970
From: J. P. Lyon, Idaho Nuclear Corporation, LY-217-70
To: W. A. Erickson, U. S. Atomic Energy Commission

Attachment 2:
Subject: Letter transmitting documentation of waste oil disposal at CFA in the borrow pits at the southeast end of Lansing Boulevard.
Date: October 5, 1970
From: C. W. Bills, U. S. Atomic Energy Commission
To: F. H. Anderson, Idaho Nuclear Corporation

Attachment 3:
Subject: Cover letter for LY-217-70
Date: October 14, 1970
From: F. H. Anderson, Idaho Nuclear Corporation, An-102-70
To: C. W. Bills, U. S. Atomic Energy Commission

Attachment 4:
Subject: Nonradioactive Waste Oil Disposal Study, study of existing waste oil disposal practices and recommendations for future disposal practices at NRTS.
Date: February 1971
Prepared by: J. C. Commander, Idaho Nuclear Corporation

Attachment 5:
Subject: Administrative Memo (Form EG&G-853A), notice to personnel that only used oil will be accepted at the CFA oil collection station.
Date: April 10, 1980
From: J. R. Dubay, EG&G Idaho, Inc.
To: EG&G Idaho Personnel

Attachment 6:
Subject: Administrative Memo (Form EG&G-853A), notice to personnel that safe work permit is required to dispose of waste oil at the CFA oil collection station.
Date: June 27, 1980
From: J. R. Dubay, EG&G Idaho, Inc.
To: EG&G Idaho Personnel

Attachment 7:
Subject: Interoffice Correspondence EG&G Idaho, Inc., draft procedure for disposal of ethylene glycol and cutting oils.
Date: July 30, 1980
From: R. W. Passmore, EG&G Idaho, Inc., Pass-71-80
To: J. R. Fielding, EG&G Idaho, Inc.

Attachment 8:
Subject: Memo of Conversation, personnel interview with Dave Dahlquist on past disposal of waste oil, oil filters, solvents, and other CFA shop waste.
Date: April 14, 1993 (Form EG&G-561)
Interviewer: Steven H. McCormick, EG&G Idaho, Inc.
Interviewee: Dave Dahlquist, EG&G Idaho, Inc.

Attachment 9:
Subject: Office Vision Note, disposal of waste oil in trenches at CFA.
Date: May 13, 1993
From: Dave F. Dahlquist, EG&G Idaho, Inc.
To: Steven H. McCormick, EG&G Idaho, Inc.

Attachment 10:
Subject: Allied Chemical Report, Section 7.25
Date:
Prepared by: Allied Chemical Corporation

Attachment 11:
Subject: Safety Appraisal of EG&G Idaho Chemical Disposal Practices
Date: July, 1980
From: Industrial Hygiene Section, EG&G Idaho, Inc.

Attachment 12:
Subject: Memo of Conversation on past operations of CFA Landfill II and disposal of oil in the borrow pit at the east end of Lansing Blvd.
Date: November 4, 1993
Interviewer: Jim Crandall, EG&G Idaho, Inc.
Interviewee: Lee Mangum, EG&G Idaho, Inc.

Attachment 13:
Subject: Memo of Conversation on past operations of CFA Landfill II and disposal of oil in the borrow pit at the east end of Lansing Blvd.
Date: November 4, 1993
Interviewer: Jim Crandall, EG&G Idaho, Inc.
Interviewee: Fred Olsen, EG&G Idaho, Inc.

Attachment 14:
Subject: Memo of Conversation on past operations of CFA Landfill II and disposal of oil in the borrow pit at the east end of Lansing Blvd.
Date: November 4, 1993
Interviewer: Jim Crandall, EG&G Idaho, Inc.
Interviewee: Peter Depue, EG&G Idaho, Inc

Attachment 15:
Subject: Memo of Conversation on past operations of CFA Landfill II and disposal of oil in the borrow pit at the east end of Lansing Blvd.
Date: November 4, 1993
Interviewer: Jim Crandall, EG&G Idaho, Inc.
Interviewee: Randy Drage, EG&G Idaho, Inc.

Distribution (complete package):

Distribution (summary page only):

Author / Dept.	Reviewed / Date	Approved / Date
Steven H. McCormick 9/12/94		TPC Program 9/26/94
	EG&G Review / Date: V. W. Watson 9/23/94	EG&G Approval / Date

Attachment 1

Subject: Letter on waste oil disposal procedures—waste oil to be used for dust suppression on roads and weed control in borrow pits.

Date: October 2, 1970

From: J. P. Lyon, Idaho Nuclear Corporation, LY-217-70

To: W. A. Erickson, U. S. Atomic Energy Commission

Branch Oct 6, 1970
7.h 2.2.6

IDAHO NUCLEAR CORPORATION

P.O. BOX 1845 IDAHO FALLS, IDAHO 83401

208-522-6640
LD-208-526-0111

October 2, 1970

Disposition of
Used Motor Oil
Ly-217-70

Mr. W. A. Erickson, Director
Contracts and Support Division
Idaho Operations Office
U. S. Atomic Energy Commission
Idaho Falls, Idaho

Dear Mr. Erickson:

Following a recent discussion with Mr. E. E. Brown concerning the disposition of used motor oil at the NRTS, we have developed the following plan for retention and ultimate disposition of the oil.

We currently have available a 10,000 gallon tank and a 50,000 gallon tank which can be used for accumulation and storage of oil. The 10,000 gallon tank is in use and is full; the 50,000 tank has not been used and will not be used unless we are unable to dispose of enough oil before winter to create enough reserve capacity in the 10,000 gallon tank to last through the winter. There are also about 200 drums of used oil which must be disposed of in an acceptable manner.

~~Specifically, we plan to dispose of most, if not all, of the oil by spraying it on dirt roads and highway shoulders within the NRTS using a 500 gallon spray unit [illegible] equipped truck.~~ The roads which can beneficially receive a topping of oil are the road to the burial ground and the road to the Big Lost River diversion area. The road shoulders we plan to treat are on Lincoln Boulevard from the NRF Junction to the intersection with highway Idaho 88 near the TAN area. The areas are marked in red on the attached NRTS map.

Application of oil to the road shoulders will help control weed growth and hopefully reduce the requirement for soil sterilization. Application of oil to dirt roads using a spray boom will unavoidably result in some minor puddling but will not result in objectionable accumulation in the ditches. In warm weather, small puddles should soak in within one to two days. We do not expect to dispose of used oil in the manner planned when the weather is cold because absorption is too slow to avoid creating a mess.

We have handled a minor amount of waste oil for NRF in the past and will continue to do so upon request. We have not received oil from ANL but could do so if they have a problem.

~~Disposal of oil by open pit dumping will be discontinued but if the volume eventually exceeds that which can be sprayed on roads and shoulders we will be forced to consider fenced open pit disposal or controlled burning since we do not believe there is a market in this area for this oil even if we give it away.~~ It is my personal feeling, based on more than five years experience in lube oil development, that economic reclamation for reuse in Site equipment is out of the question.

If the stated plan for disposing of oil does not meet your approval, alternate suggestions will be appreciated.

Very truly yours,

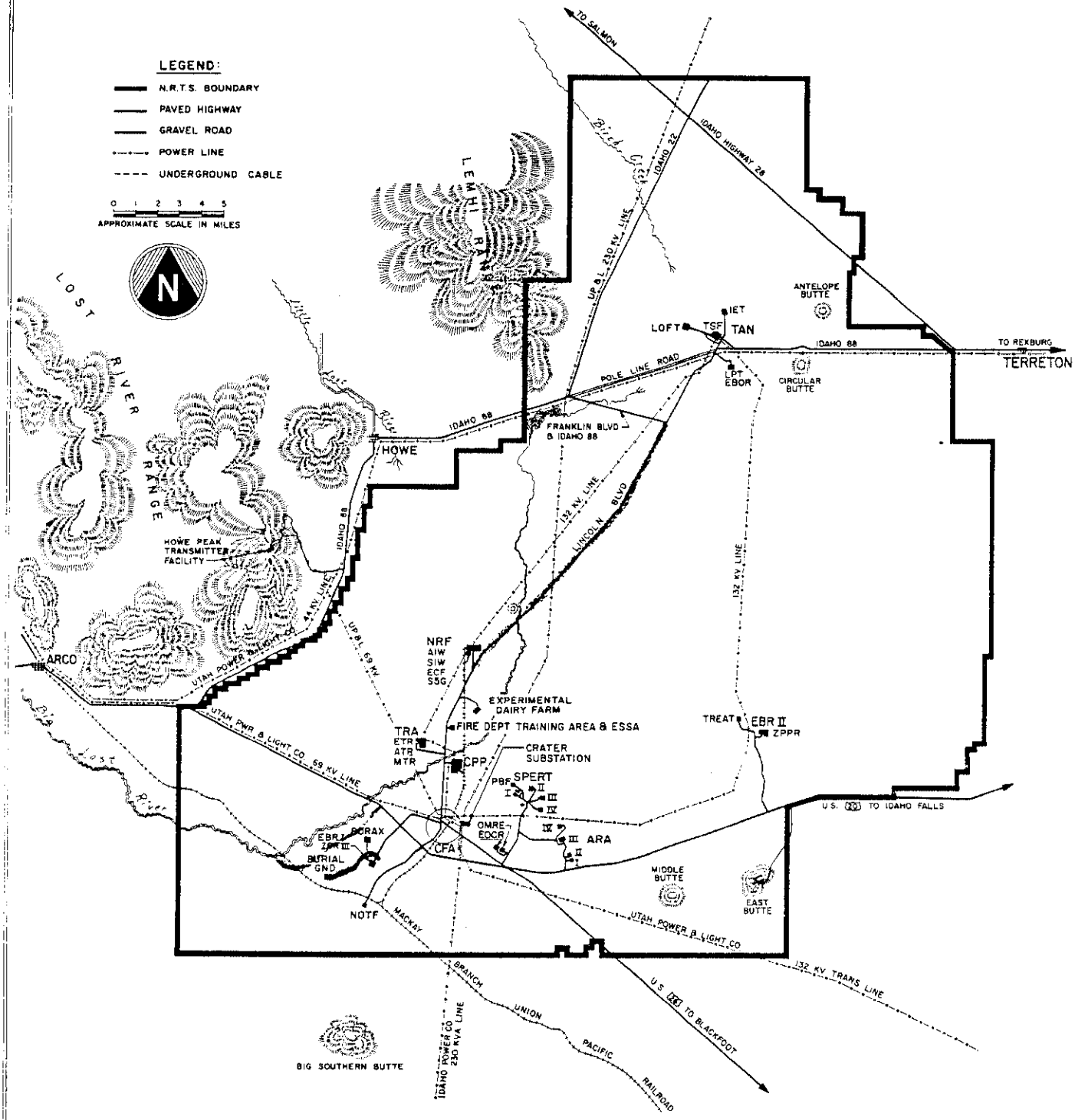
JPL:na

J. P. Lyon
Assistant General Manager

Attachment

cc: W. A. Erickson w/attach.
C. M. Rice w/attach.

NATIONAL REACTOR TESTING STATION



850-104-100-12

REVISED 9-10-68

Attachment 2

Subject: Letter transmitting documentation of waste oil disposal at CFA in the borrow pits at the southeast end of Lansing Boulevard.

Date: October 5, 1970

From: C. W. Bills, U. S. Atomic Energy Commission

To: F. H. Anderson, Idaho Nuclear Corporation

WM

OCT 5 1970

Mr. F. H. Anderson
Assistant General Manager
Idaho Nuclear Corporation
Idaho Falls, Idaho 83401

Subject: DISPOSAL OF NON-RADIOACTIVE CONTAMINATED WASTE OIL AT THE NRTS

Dear Mr. Anderson:

During a site visit on September 24, 1970, personnel from our Waste Management Branch observed that an unidentified amount of oil has been dumped into the borrow pits at the southeast end of Lansing Boulevard (behind the heavy equipment yard). From all indications, waste oil has been dumped in this area for quite sometime. The continuation of this practice cannot be condoned.

Several years ago, ID discussed the disposal of waste oil with various people within INC and at that time, it was mutually agreed that all oil would be stored in drums at the AEC's Fire Drill Field. It was further agreed that INC Maintenance would use a greater portion of this oil to suppress dust on the various roads around the site with the balance being used by the Fire Department in their brigade training program. It is apparent that this program has not materialized.

As a result of our findings, an informal meeting was held on September 24, with D. D. Coward, INC Industrial Hygiene Group, to discuss a course of action. At this meeting, INC was verbally requested to immediately stop dumping oil in the borrow pit and begin storing this material in drums at the Drill Field. This program is to remain in effect until such time as a site-wide survey can be made to determine the amount of oil generated and alternate methods of disposal.

Although not mentioned at this meeting, the dumping restriction is also applicable to oil generated at the north end and disposed of in an open pit at the TAN burn pit area.

With the onset of winter and the inability to use this material on unpaved roads during this period, it is imperative that a short-term solution to this problem be developed at the earliest possible date. In this regard, we would appreciate receiving from you by November 6, 1970, a plan of action which will carry us over the winter months.

On a long-range basis, we are suggesting that this program be identified under Fire Safety and Operating Conditions Priority Number 22, scope of which will be discussed in a letter to you in the very near future.

Very truly yours,

C. Wayne Bills, Director
Nuclear Technology Division

NT

cc: R. B. O'Brien, INC
H. J. Argyle
W. A. Erickson
R. E. Swanson
D. E. Williams
J. R. Horan

WM
JTCollins:sn
10/2/70
File: 2.2.6

WM
GWehmann

NT
CWBills

Attachment 3

Subject: Cover letter for LY-217-70

Date: October 14, 1970

From: F. H. Anderson, Idaho Nuclear Corporation, An-102-70

To: C. W. Bills, U. S. Atomic Energy Commission

IDAHO NUCLEAR CORPORATION

P.O. BOX 1845 IDAHO FALLS, IDAHO 83401

208-522-6640
LD-208-526-0111

October 14, 1970

Disposal of Non-Radioactive
Contaminated Waste Oil at the NRTS
An-102-70

Dr. C. W. Bills, Director
Nuclear Technology Division
Idaho Operations Office
U. S. Atomic Energy Commission
Idaho Falls, Idaho

Dear Dr. Bills:

At the request of Mr. Elmo Brown, Mr. J. P. Lyon has already responded to Mr. Erickson on the subject.

Attached is a copy of Ly-217-70 which we believe answers the concerns expressed in your October 5 letter.

Very truly yours,

F. H. Anderson
Assistant General Manager

FHA:jg

Attachment

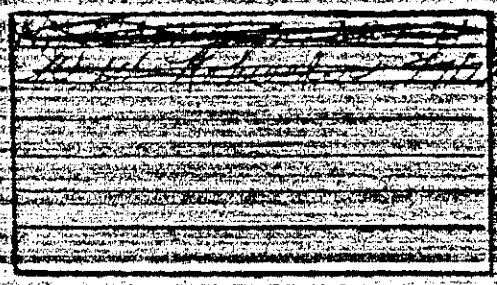
Attachment 4

Nonradioactive Waste Oil Disposal Study

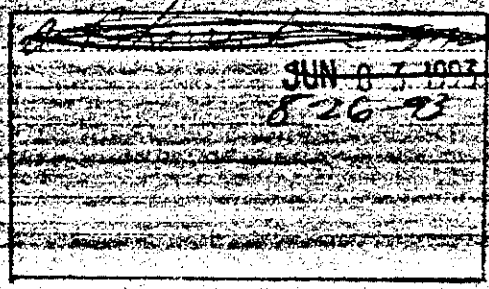
Subject: Study of existing waste oil disposal practices and recommendations for future disposal practices at NRTS.

Date: February 1971

Prepared by: J. C. Commander, Idaho Nuclear Corporation



NONRADIOACTIVE WASTE OIL DISPOSAL STUDY



IDAHO NUCLEAR CORPORATION
NATIONAL REACTOR TESTING STATION
IDAHO FALLS, IDAHO 83401

PREPARED FOR
U. S. ATOMIC ENERGY COMMISSION
IDAHO OPERATIONS OFFICE
UNDER CONTRACT NO. AT(10-1)-1230

LEGAL NOTICE

NONRADIOACTIVE WASTE OIL DISPOSAL STUDY

BY

J. C. Commander

IDAHO NUCLEAR CORPORATION

A JOINTLY OWNED SUBSIDIARY OF

AEROJET GENERAL CORPORATION
ALLIED CHEMICAL CORPORATION
PHILLIPS PETROLEUM COMPANY

Date Published - February 1971

Prepared For

U. S. Atomic Energy Commission

Idaho Operations Office

Under Contract No. AT(10-1)-1230

most desirable from the standpoint of conservation of national resources. Unfortunately, present legislation places rerefiners in a noncompetitive position with respect to the major refiners and as a result, commercial reclamation of waste oil is not cost effective at this time. Methods which are economically feasible include use of waste oil as a fuel oil additive or as a surface treatment for dirt roads. In addition, it is expected that the NRTS Fire Department will continue to use approximately 2500 gallons of waste oil per year in the firefighting training program.

ENVIRONMENTAL IMPACT

Rerefining of waste oil is the most effective means for disposal of used oil without some danger of pollution. Used oil can also be used as an additive to No. 5 fuel oil and combusted by properly adjusted burners without polluting the atmosphere above applicable Federal and State air pollution control regulations. The waste oil can also be applied to unpaved roads as a surface treatment. When properly applied, blended and graded the oil helps to consolidate light soil particles, forms a more dense running surface and reduces the dusting problem with no adverse environmental effects. Oil can be burned in properly designed incinerators and the gaseous effluent can be controlled to within allowable limits, however open pit incineration is not acceptable since a great deal of smoke will result from incomplete combustion of the oil.

COST COMPARISON

Storage of waste oil at the Central Facilities Area is accomplished in a cost effective manner. Storage of waste oil in 55 gallon drums as is now being done at TRA and NRF is an accepted practice, however it is more costly than oil sump storage, and is more hazardous due to the need for multiple handling of the drums and the potential danger of drum rupture and leakage. A savings of about 3.7¢ per gallon in collection costs could be realized if waste oil storage sumps were provided at TRA and NRF. Transportation costs for waste oil vary depending upon the distance to the market or disposal point. Transportation of the oil

to Salt Lake City will cost 2.5¢ per gallon while transportation to NRTS points of use will cost as low as 0.29¢ per gallon. Waste oil disposal methods were costed based upon the disposal of 21,500 gallons of waste oil per year. On this basis, disposal to a rerefiner at Salt Lake City will cost $420 per year; use as a dirt road surface treatment will cost $200 per year; use as a supplement to No. 5 fuel oil will result in a savings on the No. 5 fuel oil bill of $1,000 per year. However, the cost of buying Calcium Chloride to treat dirt roads not treated with road oil will equal $9,000 per year. Incineration of the oil in a new incineration facility will cost $5,200 per year and incineration in a modified kerosene burner at ICPP will cost $3,600 per year. If the recommendations of this study are accepted, and implemented, the total cost of NRTS waste oil management including storage, collection and disposal will equal approximately $1,300 per year.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions reached as a result of the study are as follows:

- Between 19 and 24 thousand gallons of waste oil are generated each year at NRTS.
- Segregation of waste lubricating oils from water soluble cutting oils and solvents is feasible and should be done at the point of generation, with containers suitably tagged to identify contents.
- Commercial reclamation of waste oil is not now economical.
- Waste oil can be disposed of economically without adverse effect on the environment.
- Use of waste oil as a road oil is the most cost effective disposal method presently available.

Recommendations are that:

- INC continue the current practice of waste oil collection and storage until $6,000 of capital funds can be budgeted to provide new 5,000 gallon waste oil storage sumps at TRA and NRF.

- With the exception of 2,500 gallons per year required by the AEC Fire Department Training program, use all waste oil generated as road oil to be applied by an approved procedure.
- Periodically review status of commercial reclamation of waste oil. If current detrimental rulings were to be revised, the economics of reclaiming used lubricating oil should be reviewed.
- Solvents, water soluble machine oils and other liquid wastes should be segregated from the used lubricating oils.

CONTENTS

NONRADIOACTIVE WASTE OIL DISPOSAL STUDY

I. INTRODUCTION

Effective waste management requires the application of sound engineering logic to the analysis of solid, liquid or gaseous waste streams. Waste management functions which should be considered in the analysis include those of generation, collection, transportation, processing and disposal. Since each of these functions can directly or indirectly affect the environment, it is important that the proper stimulus be applied to the analysis. Stimuli for review of a waste management system should derive from: Health and Safety Standards, Economic Incentive, Environmental Impact and Esthetic Viewpoint. This nonradioactive waste oil disposal study was conducted based on the above guidelines in order to provide information for a management review of waste oil disposal system alternatives which will assist in the selection of an optimum solution.

1. STATEMENT OF PROBLEM

Idaho Nuclear Corporation, as a service contractor to AEC-ID, is responsible for the collection and disposal of nonradioactive waste oil generated at the National Reactor Testing Station. Areas generating waste oil and which are serviced by INC include CFA, TRA, NRF, TAN, CPP, EBR-II and site Construction Contractors. Waste oil is collected monthly, semiannually or on a call basis; and in the past has been disposed of by dumping and covering or burning in open pits. Currently the oil is being stored for use in the spring and summer months as a surface treatment for dirt roads. A small portion of the waste oil is disposed of by the AEC Fire Department for training of professional firemen and NRTS Fire Brigade personnel. It is not evident that all of the waste oil generated at NRTS can be thus utilized, nor has the economic and environmental impact of these disposal methods been analyzed. It is therefore desirable to investigate the waste oil as a product stream; to analyze alternative disposal methods; and to recommend an optimum solution to the problem of nonradioactive waste oil disposal.

2. SCOPE OF STUDY

This study included investigation and analysis in the following areas:

- Applicable Regulations and Standards
- Waste Oil Generation at NRTS
- Feasibility of Waste Oil Segregation
- Nonradioactive Waste Oil Disposal Alternatives
- Environmental Impact
- Costs of Alternative Disposal Alternatives

The objective of the study was to provide for the evaluation and selection of the optimum solution to disposal of nonradioactive waste oil for NRTS.

3. METHOD OF PROCEDURE

This study was conducted with strong emphasis on direct interviews with cognizant Operations personnel, supplemented by a nominal amount of field investigation, and a literary review of available documents. Quantitative inputs were based on field estimates which correlated closely with records of oil purchases for the related year. Qualitative inputs were based upon grab samples taken from the CFA waste oil sumps and the waste oil storage tank. These inputs were used as a basis for the analysis of disposal alternatives, environmental impact and cost studies. Evaluation of the cost and environmental impact factors formed the basis for the study conclusions and recommendations.

II. NONRADIOACTIVE WASTE OIL

1. APPLICABLE REGULATIONS AND STANDARDS

There are no universally accepted standards for waste oil disposal. Each situation requires analysis of the quantity and quality of the waste oil stream prior to selection of the air or water quality standards that apply. There are, however, numerous Federal Regulations, Executive Orders and Standards which apply to the prevention, control and abatement of air and water pollution at Federal Facilities. The AEC has issued Manual Chapter 0510, Prevention, Control and Abatement of Air and Water Pollution, revised October 13, 1970 which contains documents which apply to AEC facilities such as NRTS. They include:

Executive Order 11507, Prevention, Control and Abatement of Air and Water Pollution at Federal Facilities, February 4, 1970.

Executive Order 11514, Protection and Enhancement of Environmental Quality, March 5, 1970.

Public Law 91-190, National Environmental Policy Act of 1969, January 1, 1970

Office of Management and Budget Circular A-78, Revised May 18, 1970.

Office of Management and Budget Circular A-81, revised May 18, 1970.

The Department of Health, Education and Welfare Regulations, Title 42 CFR 76

FWQA CFR Guidelines for Federal Department Agencies and Establishments in the Prevention, Control and Abatement of Water Pollution by Federal Activities.

IAD 0510-22 issued May 28, 1970

Other regulations which become applicable when waste oil is burned in the open, used as a fuel, or fuel blend include:

State of Idaho Regulations for Control of Open Burning, Chapter 8.

Air Quality Criteria for Sulfur Oxides PHS Publication No. 1619, dated 1967.

Fuel Standards (Pacific Northwest Region).

Selected Methods for Measurement of Air Pollutants PHS Publication No. 999-AP-11, 1965.

Rulings which have influenced the practice of rerefining of waste oil include Federal Trade Commission (FTC) 1965 labeling instructions, Internal Revenue Service Tax rulings, and the Congressional handling of excise taxes. The manner in which these various regulations, standards, codes, criteria and rulings affect the disposal of waste oil will be discussed briefly in the section titled "Nonradioactive Waste Disposal Alternatives."

2. WASTE OIL GENERATION AT NRTS

Records are not kept of nonradioactive waste oil generation at NRTS, therefore the types and quantities of waste oil generated were calculated based upon the best estimates of CFA Site Services Division personnel. The resulting estimate of total waste oil generated per year was checked against the procurement records of NRTS yearly oil requirements with favorable agreement. Effective March 1, 1971 all NRTS Contractors will be required to report nonradioactive wastes, including waste oil, therefore a procedure for documenting these wastes should be instigated.

2.1 Type of Waste Oil

Waste oil generated at NRTS is made up of lubricating oil (crankcase drainings), gear lube, grease, and cutting oil. Based upon procurement records, lubricating oil accounts for 90% by volume, grease 5% and cutting oil 5%. However very little grease returns to waste, and cutting oil is filtered and recycled; therefore it is estimated that the waste oil collected is composed 99% by volume of various grades (SAE 10 to 90) of lubricating oil. Lubricating oils are the heavy distillates following kerosene in the fractional distillation of petroleum between the temperatures of 253° and 317°F. They are separated into grades, light, medium and heavy depending upon the molecular weight. The flash point of lube oils range from 300° to 600°F. and the specific gravities from 0.860 to 0.940. Additives to lube oils include tin compounds used to reduce oxidation and minimize sludging and acid formation; and detergents which are compounded in lube oils for internal combustion engines to prevent and break down carbon and sludge deposits.[1] Waste lube oil as drained from crankcases obviously contains dirt and other solid contaminants as

well as water and acids. Samples of waste oil taken from the service station and equipment repair shop waste oil sumps and the CFA waste oil storage tank were analyzed at CPP Analytical Chemistry. Table 1 shows the result of the analysis, which indicates that the waste oil averages by weight of 95.83% lube oil, 1.88% water, 1.58% particulates (dirt) and 0.71% SO_2. The flash point ranged from 183°F. to 284°F, the specific gravity from 0.88 to 0.94 and the viscosity from 24 to 98 at 122°F. Since the samples were taken from the top, middle and bottom third of the respective waste oil storage receptacle, it seems reasonable to assume that the analysis is representative of most of the waste oil generated at NRTS.

Nonradioactive Waste Oil Analysis

Table 1

Sample No.	Sulfur % wt	Water % wt	Particulates % wt.	Flash Point °F	Specific Gravity	Viscosity Seconds, Saybolt @ 122°F
CFA-SS*-1	0.47	1.21	0.32	239	0.8806	37.7
2	0.43	2.46	0.80	284	0.8904	39.7
3	0.44	2.38	0.68	277	0.8911	41.8
CFA-RS**1	0.64	0.50	0.33	183	0.8773	24.1
2	0.70	0.85	1.30	208	0.9059	55.0
3	0.68	64.9(1)	1.07	189	0.9289	24.8
CFA-WOS***						
1	0.95	2.46	2.00	226	0.9205	77.3
2	1.10	2.32	3.54	233	0.9379	96.7
3	1.03	2.86	4.16	230	0.9283	89.0

(1) Bottom third of CFA Repair Shop Sump filled with water, sample not representative of waste oil.

* CFA-SS means Central Facilities Area Service Station Sump.

** CFA-RS means Central Facilities Area Repair Shop Sump.

*** CFA-WOS means Central Facilities Area Waste Oil Storage Tank.

2.2 Quantities of Waste Oil

The quantity of waste oil generated throughout the NRTS was estimated based upon an oral survey of the Site Services Division, TAN Operations and ANL Maintenance Division. The results of the survey are shown by Table 2 which indicates the generation of 19 to 24 thousand gallons of waste oil per year. This figure was compared with INC Materiel Records Table 3 which indicated a 1970 lubrication oil requirement of 26,000 gallons. Since a fraction (10 to 15%) of motor oil is burned up or otherwise lost there is an apparent good correlation between oil usage and waste oil generation estimates. For purposes of this study, the higher estimate of waste oil generation will be used when considering alternative disposal methods.

2.3 Collection Procedure

Waste oil is collected from the site generators on a periodic basis varying from once a month to twice a year. Site Services Division collects approximately 40 - 55 gallon drums twice a year from TRA and from NRF. The cost of collection from these areas is not established by records, however it is estimated that the operation takes two men one-half a day to pick up, load and empty 40 - 55 gallon drums. Equipment used in the operation includes one fork lift, a lowboy trailer and a tractor. Waste oil is collected from the CFA repair shop and service station oil sumps approximately once a month. The oil is pumped from the sumps into a 500-gallon Dumpster container which is transported to storage by a Dempster-Dumpster piggyback truck. Approximately one-half day for two men is required to pump the sumps and transfer the waste oil to storage. TAN Operations collects approximately 10 - 55 gallon drums per year of waste lube oil which is hauled once a year to Fire Station #3 drill field. Approximately 100 gallons per year of water soluble cutting oil is pumped from the recirculating reservoir. This oil is sprayed along the TAN railroad tracks as a weed control measure, therefore it doesn't appear in the NRTS total waste oil inventory. ANL collects waste lube oil in 55 gallon drums. An estimated two drums per year are collected, and when they are filled, ANL Maintenance uses an oil spreader to apply the oil as a surface treatment of unpaved roads at ANL. Every three or four years ANL will have a large quantity of waste oil such as from the turbine servicing. On these occasions INC

NRTS NONRADIOACTIVE WASTE OIL GENERATION

Table 2

Area	5,000	10,000	15,000	20,000	25,000
	Waste Oil in Gallons/Year. (Estimated)				
TRA					
Max.			(80 x 55 gal. = 4,400 gals.)		
Min.			(60 x 55 gal. = 3,300 gals.)		
NRF					
Max.			(80 x 55 gal. = 4,400 gals.)		
Min.			(60 x 55 gal. = 3,300 gals.)		
CFA					
Max.					(15,000 gals.)
Min.					(12,000 gals.)
TAN					
Max.			(500 gals.)		
Min.			- - -		
ANL					
Max.			(100 gals.)		
Min.					
Total					
Max.					
Min.					

1970 YEARLY MOTOR OIL REQUIREMENTS
(Based on 1969 Usage)

Table 3

Classification	Grade	Subtotal In Gallons	Total In Gallons
Motor Oil (nondetergent)	SAE 10 HD	1,267	
	20 HD	7,150	
	30 HD	7,090	
	40 HD	120	15,627
Motor Oil (detergent)	SAE 20 HD	270	
	30 HD	6,050	
	40 HD	3,300	9,620
Gear Lube	SAE 90		
Grease, Multi-purpose		21	
Grease, Wheel Bearing		30	
Grease Chassis		144	1,355
	Total Oils and Grease		26,602

is called upon to collect from 500 to 1,000 gallons of turbine drain oil which is delivered to the CFA Waste Oil storage tank. HSW&A, a major construction contractor on the site collects waste oil in 55 gallon drums and delivers it to the CFA Service Station sump where it is counted as part of the yearly CFA accumulation of waste oil. Since labor and equipment rental time records are not maintained separately for these collection functions, cost figures will be based upon best estimates from the responsible organizations of labor and equipment usage for this function.

2.4 Containment and Storage Procedure

Waste oil containment (temporary) and storage practice appears to be in accordance with standard commercial and industrial practice. Temporary containment facilities at CF consist of a 1,000-gallon waste oil sump located at CF 665 Maintenance and a 500-gallon waste oil sump at the CF Service Station. Other areas surveyed store their waste oil in 55 gallon drums on external slabs in accordance with NFPA recommended practices which states "Crankcase drainings and flammable or combustible liquids shall not be dumped into sewers, but shall be stored in tanks or tight drums, outside any building until removed from the premises." (2) Permanent waste oil storage requirements are accommodated by a 10,000-gallon underground oil storage tank located adjacent to the fuel oil storage facility. The tank is equipped with a loading funnel, pumps and manifolding for loading and unloading operation. Should additional permanent storage capacity be required, a spare fuel oil above ground tank (estimated capacity 40,000 gallons) is available which could be placed in auxiliary storage service.

3. FEASIBILITY OF OIL SEGREGATION

NRTS nonradioactive waste oil is composed approximately 99% of lubricating oil. The remaining 1% is composed of cutting oil which is generated primarily by TAN machine shops, and solvents. It is feasible to segregate cutting oils from lube oil, and this is the current practice of TAN Operations. Solvents should also be segregated as they can degrade the waste oil with regard to potential use as a fuel oil additive or a dirt road surface treatment. It is not feasible nor desirable to segregate the various grades of lubricating oil since this practice would

require the acquisition of a number of additional storage sumps and tanks at CFA, and would add greatly to the record keeping required to insure crankcase drainings were properly identified by grade. Gear lube and grease could be segregated from lube oil, however only 5% of the volume of lubricants purchased is gear lube and grease and very little of that returns as waste, while 85% of all motor oil is recovered as waste oil. The estimated 1 or 2% of heavy lube mixed with the light and medium lube oils should not influence the rational used to judge waste oil disposal methods. Water, acids, particulates and other contaminants found in crankcase drainings cannot be readily segregated from the waste oil at the point of generation. These contaminants can be separated in part by filtration and adsorption techniques at the use point. The desirability of attempting to separate waste oil contaminants from the oil will depend largely upon the end use contemplated for the oil and will be discussed again in the section covering waste oil disposal alternatives.

III. NONRADIOACTIVE WASTE OIL DISPOSAL ALTERNATIVES

A national study by Arthur D. Little,Inc. indicates that of the approximately one billion gallons of motor oil purchased in America, 850 million gallons of oil were drained from crankcases as waste oil. About 125 million gallons were rerefined and returned to use as lubricants. About 275 million gallons were used as fuel oil, where minimal reprocessing was required, and estimates of from 175 to 325 million gallons were simply dumped on lots near service stations or allowed to drain into sewers. At NRTS, we are concerned about a fraction of the national problem, the disposal of approximately 24 thousand gallons of waste oil, however some of the same disposal options are available and will be considered in conjunction with national commercial and industrial practice. Disposal alternatives which will be reviewed include commercial reclamation, use as fuel oil (for boilers), use as a surface treatment for unpaved roads, disposal by incineration, disposal by direct burial, and use as fuel oil for the ICPP Waste Calciner.

1. COMMERCIAL RECLAMATION

Lubricating oil drained from crankcases contains dirt, carbon, water, acids, and other substances not found in refined lubricating oil, however rerefiners argue that crankcase drainings have far fewer impurities than the original crude oil from which the lubricating oil was refined. It can be restored to the same SAE grades as the original oil since the mineral oil itself doesn't wear out or suffer from use although part is burned up or otherwise lost. The rerefining industry can process waste lube oil, effectively remove the contaminants and chemical additives and return quality lubricating oil to the market. From this one would expect no problem in finding refiners of used oil, yet a survey of oil dealers and refiners in the intermountain region revealed little interest by the industry in waste oil. Table 4 shows the companies contacted and their response to the question "Would you be interested in bidding for approximately 20,000 gallons per year of waste lubricating oil from NRTS?"

Industry Response to Waste Oil Inquiry

Table 4

Company	Location	Response
American Oil Company	Idaho Falls	Not Interested
Husky Petroleum	Idaho Falls	Not Interested
Cowboy Oil Company	Pocatello	Not Interested
American Oil Company	Twin Falls	Not Interested
American Oil Company	Salt Lake City	Not Interested
Little America Refining Company	Salt Lake City	Not Interested
Phillips Petroleum Company	Salt Lake City	Not Interested
Utah Emulsions Company	Salt Lake City	Not Interested
Economy Oil Company	Salt Lake City	Will charge 2¢/gal to pick up and dispose of NRTS waste oil

This lack of interest in waste oil processing is not due to technical problems associated with the recovery operations. It is due rather to competitive disadvantages in the form of tax laws and labeling requirements which discourage rerefining. The Federal Trade Commission (FTC) imposed labeling requirements upon rerefined motor oil which in a sense labels the product as inferior and makes the handling and distribution of rerefined oil by distributors too costly. In addition a six-cent-per-gallon tax on lubricating oils was removed by allowing the off-the-highway users to recover taxes paid, however the Internal Revenue service ruled that the refiner was not a user and therefore was not eligible to recover taxes paid on new oil used in the process nor to claim the six-cent-per-gallon tax refund on the rerefined oil produced. These competitive disadvantages in the form of rulings, plus subsidies enjoyed by major oil producers of about three cents per gallon on 20% of their production has practically forced the rerefiner out of business in areas where the cost of transporting the waste oil from its point of generation to the rerefiner is greater than three to four cents per gallon. As a result of the noncompetitive situation in which rerefiners have been placed, it appears that NRTS would have to pay at

least two cents-per-gallon to a rerefiner for disposal of approximately 20,000 gallons per year of waste oil.

2. USE AS FUEL OIL

The term fuel oil applies to distillates of petroleum or shale oil used in diesel engines and in oil burning furnaces. True fuel oils are the heavier hydrocarbons in kerosene, but the light or distillate oils are used largely for home heating while the heavy or residual oils are used as industrial fuels. Most marketed fuel oils have been refined to remove impurities and to fix the upper and lower limits of specific gravity, flash point, viscosity and heating value. Table 5 [3] provides the United States Bureau of Standards Specifications for Fuel Oil, and Table 6 is a summary of test analysis of fuel oil procured for use at NRTS.

COMMERCIAL STANDARDS FOR FUEL OILS

Table 5

No.	Flash Point °F	Pour Point °F	H_2O and Sediment %	Carbon Residue %	Gravity API	Viscosity Universal % 100°F	Sulfur %
	Min.	Max.	Max.	Max.	Min.	Max.	Max.
1	100 or Legal	0	Trace	0.15	35	- -	0.5
2	100 or Legal	20	0.10	0.35	26	40	1.0
4	130 or Legal	20	0.50	- -	- -	125	No Limit
5	130 or Legal	- -	1.00	- -	- -	- -	No Limit
6	150 or Legal	- -	2.00	- -	- -	- -	No Limit

TEST ANALYSIS FROM 1970
OF
NRTS NO. 5 AND NO. 6 FUEL OIL

Table 6

Supplier	Flash Point Of	Pour Point Of	Gravity API	Viscosity % 122° SFS	Sulfur %	Btu
American						
No. 6	230	+70	6.8	58	1.6	150,000
Husky						
No. 5	190+	+100	21.0	162	0.623	149,495
No. 6	200+	+60	18.6	40	0.740	147,894
Phillips						
No. 5	200+	90	5.1	26.8	0.67	154,900

The NRTS (excluding NRF) yearly requirement for fuel oil, based upon 1969 usage is as follows:

No. 2 Fuel Oil	1,260,000 gallons
No. 5 Fuel Oil	3,000,000 gallons
No. 6 Fuel Oil	4,000,000 gallons

Of this total usage, approximately 300,000 gallons of No. 2 fuel oil and 500,000 gallons of No. 5 fuel oil are used at CFA, SPERT and ARA. It would not be practical to mix waste lube oil with No. 2 fuel oil due to the difference in specific gravity and viscosity. However No. 5 fuel oil and waste lube oil are very similar in their critical properties, will mix readily and, in proper proportions, waste lube oil could be blended with No. 5 fuel oil for use in those CF boiler facilities which utilize No. 5 fuel oil. A precedent for use of waste oil blended with fuel oil has been established at Brookhaven operations. The waste cutting oils, kerosene, and lube oils are collected into a 1,000 gallon settling tank. The waste oil is then strained, passed over a magnetic separator and pumped into a 300,000 gallon storage tank for No. 6 fuel oil. This use of waste oil is practiced only in the winter months. During the summer months the oil is used for surface treatment of dirt roads.

2.1 CFA Boiler Plants

All of the CF Boiler Plants are rated for No. 2 fuel oil, however recommended operation is with No. 4 or No. 5 fuel oil. The typical plant uses heaters to preheat the fuel oil to 160°F prior to pumping it to the burner. The burners are all mechanical atomizing types with low pressure combustion air provided by the boiler fans.

2.1.1 The CFA Cafeteria, Building CF 662 is serviced by two boilers with combined rating of 5.5 million Btu per hour. The plant is fueled by No. 5 fuel oil from a single underground 5,000 gallon tank. The facility uses approximately 160,000 gallons per year of No. 5 fuel oil.

2.1.2 CF 665 Equipment Repair Building is serviced by a twin boiler plant with a combined rating of 7.0 million Btu per hour. The plant is fueled by No. 5 fuel from a single 12,000 gallon underground fuel storage tank. During the winter months, fuel is used at a rate of 400 gallons per 24 hour period. Total fuel usage is approximately 80,000 gallons per year of No. 5 fuel.

2.1.3 CF 669 Laundry is serviced by a single boiler rated at 3.5 million Btu per hour. The plant uses No. 5 fuel from a single 10,000 gallon underground storage tank. This plant uses approximately 17,000 gallons per year of No. 5 fuel.

2.1.4 CF 674 Warehouse is serviced by two boilers in CF 671, with a combined rating of 10.0 million Btu per hour. The plant uses No. 5 fuel from a single 20,000 gallon underground storage tank. During the winter months, fuel is used at a rate of 300 to 400 gallons per 24 hour period. Total fuel usage is approximately 80,000 gallons of No. 5 fuel per year.

2.1.5 CF 688 Boiler House contains two boilers with a combined rating of 17.0 million Btu per hour, which serves the CF 689 Technical Center and the CF 690 AEC Health Services Building. This plant uses No. 5 fuel from a 32,000 gallon above ground storage tank. It is the only plant which has recirculation capability having two 35-gallon per minute recirculation pumps. The plant is operated year around and uses approximately 40,000 gallons of No. 5 fuel per year.

2.2 Modifications Required to Use Waste Oil as Fuel Oil at Boiler Plants

Recirculation capability will be required in order to insure blending of the waste oil added to the fuel oil. In addition, the waste oil should be passed through a 40 mesh filter for removal of particulate material. The small percent of water contained in the fuel will not influence appreciably the boiler operation. The CF 688 boiler plant already has recirculation capability, therefore little or no modifications would be required to provide for blending a small percentage of waste oil with the No. 5 oil normally used by the plant.

2.3 Conclusions

If it is determined to be economically advisable, filtered waste oil can be added to the fuel oil supplying CF 688 boilers in the ratio of one part waste oil to nine parts fuel oil, and this blend can be burned for a sufficient period to observe combustion characteristics of the blend. During the test period particular attention should be given to the stack gas. Observations should be made for changes in Ringelman rating of the effluent from the stack. Observations of the burner flame should also be taken to determine if any adverse conditions exist such as incomplete combustion due to inadequate residence time, improper turbulance or change in the burner temperature. If it is determined that the one to nine ratio can be satisfactorily burned, the ratio of waste oil to No. 5 fuel oil should be successively changed in 10 percent steps until burner problems or stack smoking is observed. In this manner the allowable ratio of waste oil to fuel oil can be determined for satisfactory operation in the CF boilers. The test results could then influence any decision to convert other CF boiler plants to recirculation systems in order that they might also accept a blend of waste oil and fuel oil.

3. USE AS SURFACE TREATMENT FOR DIRT ROADS

Unpaved dirt or gravel surface roads are commonplace throughout the State of Idaho. These tertiary roads provide access to rural

area farms and ranches, to recreation sites, to wilderness areas and to other areas where the traffic density does not warrant road surfacing. The condition of these unpaved roads can be improved by periodic surface treatment to stabilize the fines and thereby control dust generation.

3.1 The NRTS Unpaved Roads consist mainly of limited access or emergency exit routes, which require very little maintenance or surface treatment. There are some unpaved roads however which see fairly heavy traffic and which must be maintained in suitable condition for vehicular traffic. These include Adams Boulevard, a gravel road 26 feet wide and approximately 11,300 feet in length which extends from U. S. Highway 20 to the NRTS Burial Ground; the road to the Big Lost River diversion area, approximately 26,500 feet in length, and the road to the experimental dairy farm approximately 4,000 feet in length. Surface treatment of these roads improves the riding characteristics and extends the length of time between requirements for surface maintenance.

3.2 Treatment of Unsurfaced Roads for surface conditioning and dust control is commonly done by an application of road oil or calcium chloride. Road oil, used on dirt roads, is a heavy-residue oil from the refineries[(a)] It is very effective in stabilizing the fines, controlling weed growth and reducing surface erosion due to action of the elements. Calcium Chloride is a white crystalline material which is highly hygroscopic and deliquescent. An important use for this material is for spreading on unpaved roads to aid in surface stabilization and to absorb dust[(b)] It also helps to control weed growth, acting as a soil sterilization agent. Both of these materials have been used at NRTS for treatment of unsurfaced roads and are equally acceptable from a technical standpoint. The comparative costs of using waste oil vs. calcium chloride for surface treatment will be discussed in Section V, Cost Analysis of Alternative disposal methods.

3.3 Application Techniques. Surface treatment of unpaved roads is commonly done during the spring and summer months at NRTS. A 5,000 gallon tank, installed on a lowboy trailer, is filled with waste oil and transported to the work area.

(a) Reference 1, Page 566
(b) Reference 1, Page 129

The oil valve on the tank is then opened allowing the oil to impinge on a spreader plate which fans the oil out on the road surface. Application of 5,000 gallons of waste oil takes approximately two hours. The road surface is then graded to mix and blend the oil with the road dirt or gravel. The mixing, blending and grading operations are charged to road maintenance and are required periodically whether or not a surface additive is applied. Prior to the use of waste oil as a road oil, calcium chloride (CaCl) was used as a surface treatment additive. The CaCl was purchased in 100 pound bags and was spread manually from the rear of a flatbed truck. One bag would cover approximately 75 lineal feet of nominal width dirt road. Use of CaCl also required the use of a grader to mix and blend it with the road material and to condition the road surface.

3.4 Recommendations. From the standpoint of unpaved road surface treatment either material, waste oil or calcium chloride, is acceptable. Use of waste oil on paved road shoulders is not recommended however since the accidental application of the oil to any portion of the paved surface will lead to its degradation. Paved road shoulders are best treated with calcium chloride. Waste oil should not be applied during cold weather when the temperature can be expected to drop below 50°F since the material becomes very viscous and is difficult to spread. Additionally, the unpaved road surface, if frozen, will not absorb the oil which then remains on the surface as a road hazard, a potential cause of accidents and oil smeared vehicles. Oil spreading and grading procedures should be written to insure that suitable precautions are taken in the application to prevent creating a nuisance.

4. INCINERATION OF WASTE OIL

Liquid waste incinerators are available which could incinerate NRTS Waste Oil without resultant air pollution.[4] Rohm and Haas Company designed an incinerator capable of burning 450 gallons per hour of non-uniform petroleum waste with specific gravity ranging from 0.886 to 1.053, and viscosity ranging from 0 to 75% by weight. Supplementary fuel is used with this system to bring the combustion chamber up to the initial operating temperature of 800 to 1,000°F and to add heat where necessary for high water content liquid waste. Dana Corporation's Power Take-Off

Division at Chelsea, Michigan installed a gas-fired Prenco Pyro-Decomposition incinerator to dispose of 10,000 gallons per month of cutting oils, water-soluable coolant oils and emulsions. The gas-fired incinerator is rated at 100 gallons per hour, adequate to serve the projected expansion of plant for ten years, however present loading requires operation only two days per week. At the present loading the waste liquid disposal costs average 1.25¢ per gallon of waste processed. Oxy-Catalyst, Inc. offers a variety of liquid waste incinerators said to be tailored to the customer's requirements. The Oxy-Catalyst incinerators will dispose of solvents, alcohols, organic acids, hydrocarbons, still bottoms, tar, cutting oil waste, etc. Waste is burned at temperatures from 1,000 to 2,000°F and depending upon waste content, off-gasses may require processing through air pollution control equipment. Based upon industrial experience, an incinerator capable of processing 20 gallons per hour could process all the NRTS waste oil operating an average of four days per week throughout the year. Labor associated with the operation of the waste oil disposal incinerator is estimated to be 2 man-hours per operating day which includes startup, automatic operation of the incinerator, close down and waste feed operations.

5. DIRECT BURIAL

Approximately 325 million gallons per year of used lubricating oil are disposed of by dumping onto the ground. This practice is not an acceptable solution for disposal of waste oil. Direct burial of waste oil can be done at locations where no possibility exists for contamination of water supplies. For example, sanitary landfills in Los Angeles County, California can be licensed to accept waste oil providing surface and ground waters remain separated from the burial sites by impervious boundaries. [redacted]

6. USE AS FUEL FOR ICPP WASTE CALCINER OR KEROSENE BURNER

The ICPP Waste Calciner currently uses kerosene fuel at the approximate ratio of 25 gallons per hour of operation, which on the basis of 120 days per year operation, is equivalent to approximately 72,000 gallons per year. Kerosene costs approximately 4.5¢ per gallon more than No. 2 fuel oil. Therefore No. 2 fuel oil was tried in the calciner as a substitute for kerosene. Undesirable cracking of the fuel oil was obtained and its use was discontinued pending a development program which will be initiated about September 1971 to determine if No. 2 fuel oil can be successfully used in the calciner. Since lubrication oils are from the heavy distillates following kerosene and No. 1 and No. 2 fuel oil in the fractional distillation of petroleum, it is very doubtful that waste lube oil could be successfully mixed with kerosene or No. 2 fuel for use as a calciner fuel. In any event, a development program similar to the one envisioned to verify use of No. 2 fuel oil would be required to insure that waste lube oil could be used successfully. The cost of the development program would offset any savings in calciner fuel due to the use of waste lube oil and this without consideration of the fuel storage and burner modifications which would be required to insure adequate blending of the fuel and waste oil mix.

Waste oils could be mixed with kerosene which is stripped with steam and sent to solvent burners at a rate of approximately 10 liters (2-1/2 gallons) per hour, however this would also require some modifications to the solvent burners and the waste solvent storage tanks.

Waste oil might also be used as admixture to radioactive solid waste to increase the Btu content for combustion of the solid waste under the proposed radioactive solid waste incineration demonstration program. The feasibility of this alternative will be reviewed in greater detail during the design phase of that program.

7. USE BY NRTS FIRE DEPARTMENT

The NRTS Fire Department uses approximately 2,500 gallons of waste oil per year in fire fighting training sessions. In one example,

two large pits are filled partially with water after which four-55 gallon drums of oil are spilled on the water surface and ignited. The firemen trainees then attempt to extinguish the fire using different types of extinguishing agents such as dry powder, chemical or high pressure fog. In another example a 1,500 gallon tank is partially filled with oil after which the surface is ignited. The Trainee Firefighters then use various techniques to get at the blaze with extinguishing agents. The oil used in these exercises is stored at the drill field. Part of the soil is stored in the open 1,500 gallon storage tank and the remainder is stockpiled in 55 gallon drums. Unclassified petroleum residues which are not desirable for blending with No. 5 fuel oil or for use as a road oil should be drumed and marked for delivery to the Fire Department, where they can be utilized in the Firefighting Training program. The Fire Department presently has approximately 5,000 gallons or two years' supply of waste oil on hand. Usage of waste oil for training purposes by the Fire Department is exempt from the restrictions on open burning of waste oil imposed by AEC Manual 0510, Prevention, Control and Abatement of Air and Water Pollution.

IV. ENVIRONMENTAL IMPACT

Waste oil can be an unsightly and irritating pollutant if improperly stored and utilized or processed for disposal. If used oil is dumped indiscriminately on land it will ultimately pollute nearby streams or ground water supplies; if burned in open dumps the gases and fumes released into the air can be just as severe a pollutant of the atmosphere. It is important therefore that the alternative systems proposed for use or disposal of waste oil can be analyzed for environmental impact. The alternative processing or disposal methods which will be analyzed include: commerical reclamation, use as an unpaved road surface treatment, use as an additive to fuel oil and incineration.

1. ENVIRONMENTAL SETTING: GEOGRAPHY, GEOLOGY AND HYDROLOGY

1.1 Geography

The National Reactor Testing Station (NRTS) is located on the north side of the Snake River Plain at 4,800 to 5,000 feet elevation. Basin and range type mountains rise to above 12,000 feet elevation on the northern, eastern and southern borders of the Plain. The area has a high desert climate with less than 10 inches of precipitation per year. The prevailing winds are generally from the southwest but secondary winds come from the northwest, either channeled down mountain valleys or as cold air drainage from the mountains.

1.2 Local Geology

The area of interest, Central Facilities Area (CFA), lies over Lost River deposited gravels that are 30 to 40 feet in depth. The ground surface is essentially flat with a gentle northward slope. The present Lost River is a much smaller stream than it was when the gravels were deposited. The gravels show cut and fill structure typical of deposits formed on the flood plain of a swollen, braided stream. Geological evidence indicates that the ancestral Lost River was swollen by glacial

melt water, and that it meandered over a broad flood plain which was about 5 miles wide at CFA.

The Lost River gravels overlie a thick permeable sequence of Snake River basalt. These basalts were deposited in a down-warped or down-faulted basin and may be in excess of 5,000 feet thick.[6][7][8] The basalt sequence was deposited over several million years. Periods of volcanic activity are recorded in the stratographic record as basalt flows. Between volcanic periods deposition of soil occurred and are recorded in the stratographic record as sedimentary interbeds between basalt flows.

1.3 Hydrology

The regional water table is about 460 feet below the land surface in the Snake River basalt. Local sedimentary interbeds of impermeable basalt flows cause perched water above the regional water table. Most of the basalt is fairly permeable having 5 to 10% permeable open void space. Below the water table all permeable space is filled with water of the Snake River Aquifer; above the water table interconnected permeable openings are filled with air and constitute aerifers. The air in the aerifers is not static as it flows and changes with fluctuations in the surface barometric pressure.[11] The water in the aquifer moves south to southwest down the regional gradient at about 3,000 to 5,000 feet per year.[12]

Surface water occurs at CFA only during cloudbursts or periods of melting snow. Existing flood control works, installed to protect CFA, channel runoff from the surrounding areas away from waste oil storage areas and potential waste oil disposal facilities.

2. COMMERCIAL RECLAMATION

According to a study by the U. S. Bureau of Standards, rerefining of waste oil is the only effective means for disposing of used oil without some danger of pollution. In the rerefining process, dirt, water and other contaminants are removed; and by selective distillation or

vacuum fractionation the oil is restored to the same range of SAE viscosities as the original oil. In this process the original mineral oil is saved with little or no discharge of pollutants to the environment. From an environmental and conservation standpoint commercial reclamation of used oil is the most desirable approach to waste oil disposal. Unfortunately, the current regulations governing the sale of rerefined motor oil place the rerefining industry in a position of competitive disadvantage with respect to the major oil producers. Until this situation is changed, commercial reclamation of NRTS waste oil is not economically feasible.

3. USE AS FUEL OIL

Analysis of the waste oil generated at NRTS indicates that it falls within the specification range for No. 5 fuel oil, except for sample No. 3 from the CFA Repair Shop sump which contained excessive amounts of water and sediment. With proper filtering and settling to remove water and sediments, the waste oil could be blended with No. 5 fuel oil and burned as a fuel additive. An air pollution survey of INC boiler plants indicated that No. 5 fuel purchased in accordance with the U. S. Bureau of Standards Specifications would not pollute the atmosphere beyond allowable limits. Combustion of waste oil blended with No. 5 fuel oil would not be expected to increase the level of air pollutants exhausted during the combustion of straight No. 5 fuel oil. From the environmental standpoint, NRTS waste oil could be blended and burned with No. 5 fuel oil with no undesirable environmental effects.

4. USE AS A SURFACE TREATMENT FOR UNPAVED ROADS

Use of road oil as a surface treatment for unpaved roads is commonplace in many rural areas. If properly applied and blended with the dirt or gravel surface of the road, the oil retains the fines thereby preventing dusting, wind and water erosion of the road surface. Used

motor oil has much the same consistency as road oil and can be used as a surface treatment. When blended and graded the oil adheres to the soil particles and helps to form a more dense surface. The oil is not easily leached from the surface since it is not water soluble and therefore should not find its way into surface or underground water supplies. If improperly applied the oil can drain into puddles on the road surface and cause an unsightly mess when splashed about by road traffic, as well as fouling the exposed surfaces of passing vehicles. With proper application followed by blending and grading operations surface pollution of the dirt roads can be avoided thus providing an acceptable use for NRTS waste oil.

5. INCINERATION

Disposal of waste oil by incineration is an accepted practice if the oil is burned in properly designed incinerators. The combustion process should result in no greater level of pollution than would result from the combustion of waste oil in the burners of a steam boiler. Open pit incineration of waste oil is not an accepted practice however, since a considerable amount of smoke will result from incomplete combustion of the oil. The exception to this rule applies to the NRTS Fire Department training program wherein open tanks and pits of waste oil are purposely ignited to provide oil fire fighting training to the Fire Department personnel. Approximately 2,500 gallons of waste oil per year are open burned by the Fire Department during training operations.

6. DIRECT BURIAL

Direct burial of waste oil is practiced in areas where it is considered impossible to pollute surface or underground water supplies. The geology of the CFA doesn't insure against pollution of the underlying Snake River Aquifer, therefore disposal of waste oil by direct burial is not considered an acceptable disposal method for NRTS waste oil.

V. COST COMPARISON

Factors which influence the overall cost of the various waste oil disposal alternatives considered include: Location of the NRTS with respect to markets; quantity and quality of waste oil generated; and equipment and facilities required to accomplish the desired utilization or disposal of the waste oil. These factors will be applied to the functions of waste oil storage, collection, transportation, processing and or disposal in order to arrive at the total system costs.

1. STORAGE

Waste oil is currently being stored at the point of generation in waste oil sumps at CFA or in 55 gallon drums at NRF & TRA. The existing sumps are assumed to be available at zero cost when considering alternative storage methods. The 55 gallon drums are also a no cost item since the drums in which the lube oil is delivered are used for waste oil storage. Surplus oil drums are sold for $1.00 per drum to a drum salvage company in Idaho Falls. Alternatives considered included waste oil storage at NRF & TRA in new 5,000 gallon underground storage sumps, and storage in 500 gallon above ground Dempster Dumpster containers. The amortized cost of these alternatives over a 20 year period equals $300.00 and $41.60 per year respectively above the cost of existing storage costs.

Segregation of cutting oil and lubrication oils is currently being practiced at TAN. Since the waste cutting oil generated is such a small amount, it is readily segregated and stored in 55 gallon drums.

2. COLLECTION

Waste oil is collected from the CFA waste oil sumps an average of once each month. Oil is pumped from the sumps by a portable sump pump into a 500 gallon Dempster Dumpster liquid container. The waste oil is transferred from the container to the 10,000 gallon waste oil permanent

storage tank. The cost of labor and equipment for collection from the CF sumps is approximately $650.00/year or 4.3¢ per gallon of waste oil collected. Collection from TRA and NRF is currently done from 55 gallon drums. The drums are loaded on the low boy trailer with a fork lift, taken to the 10,000 gallon waste full storage area or to Fire Station No. 3. The cost for collection of these waste oils is $410.00 per year or 4.5¢ per gallon. Optional collection methods include collection from a new 5,000 gallon sump at TRA & NRF or from above ground 500 gallon Dempster Dumpster containers. These options will cost 0.8¢ and 5.4¢ per gallon respectively.

3. TRANSPORTATION

Cost of transporting waste oil is considered to be the cost associated with loading and transporting the oil from storage to the point of use or disposal. For this purpose an average road speed of 35 miles per hour has been assumed. Round trip distances from NRTS to the point of interest have been used, although it is recognized that commercial oil distributors try to schedule their transportation equipment so that payloads are transported in each direction thereby eliminating the cost of deadheading equipment and personnel. On this basis transportation costs to potential off site waste oil disposal markets range from a low of 0.61¢ per gallon for transportation to Blackfoot to a high of 2.5¢ per gallon for transportation of the waste oil to Salt Lake City. Transportation costs to on site use or disposal areas such as the burial ground for application on dirt roads or to CPP for incineration are a stand off at 0.32¢ per gallon, and transportation to CF facilities for use as a fuel oil supplement costs 0.29¢ per gallon.

4. DISPOSAL

4.1 Commercial Reclamation

Contacts with potential waste oil refiners has been discouraging.

None of the organizations contacted would pay for waste oil from NRTS, and only one refiner, Economy Oil of Salt Lake City, quoted a price, 2¢ per gallon minimum, as a cost to pick up waste oil from NRTS. The price quoted includes the cost of transportation and disposal at their Salt Lake City facilities. The net cost to NRTS for disposal of 21,500 gallons of waste oil to a distributor would be $420.00 per year.

4.2 Road Surface Use

Use of the waste oil as a surface treatment for unpaved roads results in a spreading cost of $194.00 per year. Assuming the waste oil is free, the cost per square foot of surface treated with oil is .03¢ per square foot. Calcium chloride (CaCl) is used as an alternative to oil for controlling dusting of unpaved roads. The cost of material, equipment and labor for application of CaCl is 1.4¢ per square foot. If all 21,500 gallons of waste oil were used as a surface treatment, 645,000 square feet (approximately 8 miles of 16 foot wide dirt road) could be treated at a cost of approximately $200. Treatment of the same area of road surface with CaCl would cost $9,300 or an added cost of $9,100. In neither case does the cost include the blading and grading of the treated surface. Unpaved roads must be graded each year regardless of the type of surface application used in order to control weed growth and maintain a reasonable road surface. Butte, Bonneville and Jefferson Counties were contacted to determine their interest in purchasing NRTS waste oil for application on unpaved county roads. The results were negative. None of the counties contacted have the necessary spreading equipment, and the inhabitants dislike the use of oil on village streets because when not properly applied it tracks into their homes and commercial establishments. In addition, if the roads so treated are to be paved in the future, the oiled surface must be removed or the paving placed over it will degrade.

4.3 Use as a Fuel Oil Supplement

Analysis of the waste oil generated at NRTS indicates that it could be used to supplement No. 5 or No. 6 fuel oil. The following

costing is based on the blending of waste oil with fuel oil in the ratio of one part waste oil to nine parts fuel oil, on the assumption that filtration and blending equipment will be required at the using Facility, and on a fuel oil cost of $0.0897 per gallon. Cost of plant modifications required at the CF-688 and CF-662 boilers will equal approximately $7,000. Prorated over ten years at straight line depreciation the expense of plant modifications equal about $768 per year. Savings in fuel billings due to use of waste oil will equal approximately $1,800 per year, thus showing a net saving of about $1,032 per year. This saving must be balanced against the cost of purchasing CaCl for use on unpaved roads which could equal $9,300 if surface equal to that which could be potentially treated by waste oil was assumed to be treated instead by CaCl. In summary, if unpaved roads are not surface treated with CaCl, the potential savings due to use of waste oil as a fuel oil supplement will equal $1,032. If CaCl is procured to replace the oil for road surfacing, the savings will revert to an overall cost to NRTS of about $8,062.

4.4 Incineration

Two incineration options were considered; the first, incineration at a new incineration facility designed to accommodate 20 gallons per hour of waste oil; and the second, incineration at the ICPP waste kerosene burner. For a new facility, procurement of equipment, design and construction costs will equal approximately $30,000. Assuming straight line depreciation over a 20 year life, this amounts to a cost of $1,500 per year. Operating expenses will be about $3,700 per year for a total cost of $5,200 per year. This would be equivalent to a cost in disposal of 24¢ per gallon.

The CPP waste kerosene burner will require substantial modifications since the burner was designed for relatively light duty. Designed to burn kerosene at the rate of 10 liters (approximately 2.5 gallons) per hour, it would require a 24 hour continuous operation throughout the year to combust 21,500 gallons of waste oil. In addition, the burner would require modifications and a separate fuel storage tank and fuel oil heater would be required. These modifica-

tions would cost approximately $16,000 prorated over a 20 year period. The operating expense will be less if the equipment could be operated 24 hours per day 5 days per week, and is estimated at $2,800 per year. On this basis the total cost per year will be $3,600; this is equivalent to a cost of 17¢ per gallon for disposal of waste oil.

Function	Capital Cost in $	Operating & Amortized Capital Cost in $/yr	Cost/Gal. $/Gal.	Δ Cost Per Year
	Note (1)			
Storage				
CFA	0	0	-	
NRF & TRA				
Opt. #1	0	0		0
Opt. #2	$6,000	$300.00	$0.03	300
Opt. #3	434	41.60	0.004	42
Collection				
CFA	0	$650.00	$0.043	
NRF & TRA				
Opt. #1	0	410.00	0.045	333
Opt. #2	0	72.00	0.008	0
Opt. #3	0	540.00	0.054	463
Σ Storage & Collection				
Opt. #1	0	$410.00	$0.045	+ 33
Opt. #2	$6,000	377.00	0.038	0
Opt. #3	434	582.00	0.058	+205

Opt #1 Storage in used 55 gallon drums, collection of drums with truck, flat bed trailer and forklift. Twice/year.

Opt #2 Storage in new 5,000 gallon waste oil storage tanks. Collection once a year by 5,000 gallon oil tank on lowboy trailer.

Opt #3 Storage in 2 new 500 gallon Dempster-Dumpster containers. Collection 20 times per year.

Note (1) See Appendix for Cost Analysis Calculation.

COST COMPARISON OF NRTS
WASTE OIL STORAGE AND COLLECTION OPTIONS

TABLE 7

Function	Capital Cost	Operating & Amortized Capital Cost in $/yr.	Cost/Gal in $/Gal.	Δ Cost per Year
Transportation	Note (1)			
Idaho Falls	0	$152.00	$0.0071	$ 90.00
Blackfoot	0	132.00	0.0061	70.00
Pocatello	0	183.00	0.0085	121.00
Salt Lake	0	539.00	0.025	476.00
NRTS/Dirt Road Appl.	0	69.00	0.0032	7.00
CPP Incineration	0	69.00	0.0032	7.00
CFA Fuel Oil	0	62.00	0.0029	0
Disposal				
Reclamation	0	$430.00	$0.02	
NRTS/Road	0	194.00	0.009	
CaCl/Road	0	$9,300.00	0.0144	Note (2)
Blend/Fuel Oil	7,110	(1,072.00)	(0.048)	Note (2)
Incineration				
Opt. #1	30,200	5,254.00	0.24	
Opt. #2	15,950	3,600.00	0.167	

Option 1 Incineration in a new Incinerator Factory.

Option 2 Incineration in Modified CPP Kerosene Burner.

Note (1) See Appendix for Cost Analysis Calculations

Note (2) Use as fuel oil additive shows (savings) per year.

However this must be balanced against a possible expenditure for CACL as a replacement for the waste oil used as dirt road surface treatment.

COST COMPARISON OF

NRTS WASTE OIL TRANSPORTATION AND DISPOSAL OPTIONS

TABLE 8

5. COST SUMMARY

The results of NRTS nonradioactive waste oil storage and collection cost comparison is shown by Table 7. Option No. 2, storage in new 5,000 gallon waste oil storage tanks at NRF and TRA, with collection once a year by a 5,000 gallon oil tank on a lowboy trailer, proves to be the most cost effective option over a twenty-year period. However, selection of Option No. 2 will require the budgeting of $6,000 for capital improvements. Cost comparison of transportation and disposal alternatives are shown by Table 8. When considered alone, blending the waste oil with fuel oil shows a yearly cost savings of approximately $1,000; however, when balanced against the resultant cost of purchasing CaCl for dirt road treatment the savings reverts to an added expense of approximately $9,000 per year. In addition, the blending option will require budgeting for capital improvements in the range of $7,000.

Based upon the above analysis, it is recommended that the current practice of storing oil in 55 gallon drums at NRF and TRA be discontinued, and that the waste oil be used as a surface treatment for dirt roads. Based on total cost to the NRTS, adoption of this recommendation should result in the yearly expenditures as shown by Table 9.

YEARLY COST OF NRTS WASTE OIL MANAGEMENT

TABLE 9

Function	Cost/Gal. in $	Gal/yr.	Cost/yr. in $
Storage			
CFA	0	0	0
NRF	$0.03	4,500	$135.00
TRA	0.03	4,500	135.00
Collection			
CFA	$0.043	15,000	$650.00
NRF	0.008	4,500	36.00
TRA	0.008	4,500	36.00
Transportation	$0.0032	21,500	$ 69.00
Disposal	$0.009	21,500	$194.00
Total			$1,255.00

VI. CONCLUSIONS AND RECOMMENDATIONS

The principles of environmental protection and resource conservation demand that waste streams from residential, commercial, industrial and Government operations be evaluated for harmful content and residual value prior to the arbitrary discharge of the crude waste stream to the environment. Adherence to these principles provided the impetus for this nonradioactive waste oil disposal study, of which the conclusions and recommendations are now presented.

1. CONCLUSIONS

The investigation of NRTS nonradioactive waste oil produced the following conclusions:

1.1 Between 20 and 24 thousand gallons of waste oil, consisting of 99% used lubrication oil, are generated each year at NRTS.

1.2 Collection and storage of waste oil is compatible with NFPA recommended practice, and although operational economics should be realized, they would involve the expenditure of $6,000 of capital funds.

1.3 Segregation of lubricating oils from water soluble cutting oils and solvents is feasible.

1.4 Practice of conservation of National Resources would dictate that waste oil be rerefined, however current Federal Trade Commission and Internal Revenue Service rulings discourage commercial reclamation of used lubrication oil.

1.5 NRTS waste oil can be disposed of by commercial reclamation, by use as a fuel oil additive, by use as a surface treatment for dirt roads and by incineration without adverse effect on the environment.

1.6 Use of the waste oil as a fuel oil supplement results in a savings of approximately $1,000 per year on the yearly fuel oil bill, however this savings is offset by the expense of $9,000 for purchasing calcium chloride to replace the oil as a surface treatment for unpaved roads.

1.7 The most cost effective disposal method is the use of the waste oil as road oil for treatment of unpaved roads at NRTS.

2. RECOMMENDATIONS

Analysis of the information generated during the study resulted in the following recommendations:

2.1 INC continue the current practice of waste oil collection and storage until $6,000 of capital funds can be budgeted to provide new 5,000 gallon waste oil storage sumps at TRA and NRA.

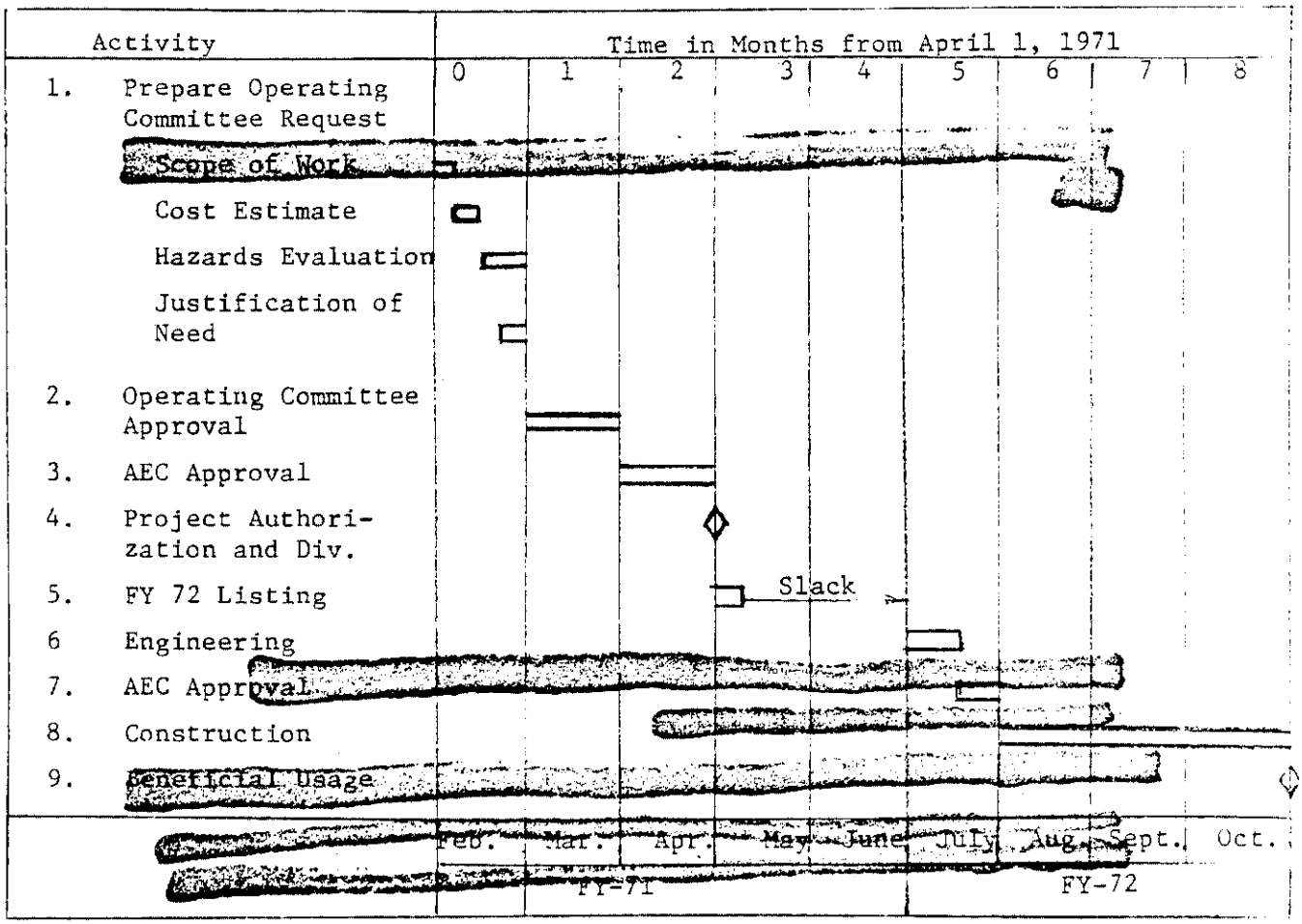
2.2 Plan to use approximately 21,500 gallons of waste oil per year as road oil. Obtain improved oil spreader bar for more uniform distribution of the oil on the road surface. Scarify and blend oil with the top several inches of dirt or gravel as soon as possible after placement of the oil. Post sections of newly oiled dirt road in order that vehicular traffic may proceed across these sections at reduced speed.

2.3 Plan to use approximately 2,500 gallons of waste oil per year in the NRTS Fire Department training program.

2.4 Periodically review status of commercial reclamation practice in the United States. If current rulings detrimental to re-refining are revised, the economics of reclaiming used lubricating oil should be reanalyzed.

3. SCHEDULE FOR IMPLEMENTATION

Implementation of the recommended improvements at NRF and TRA, which include the installation of 5000 gallon waste oil sumps at each facility, can be accomplished in accordance with the following schedule.



IMPLEMENTATION SCHEDULE

VII. REFERENCES

1. Brady, George S., Materials Handbook, Pages 445-446.

2. NFPA Volume 1, 1968-69, Pages 30-56.

3. Air Pollution Engineering Manual, U. S. Department of Health Education and Welfare, PHS Publication No. 999-AP-40, Page 509.

4. Stern, Arthur C., Air Pollution, Volume III, 1968, Page 21.

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6. Walker, E. H., 1964, Subsurface Biology of the National Reactor Testing Station, Idaho, U. S. Geological Survey Bulletin No. 1133-B.

7. Hill, D. P., 1963, Gravity and Crustal Structure in the Western Snake River Plain, Idaho, Journal of Geophysical Research, Volume 68, No. 20, Pages 5807-5818.

8. Hamilton, Warren and Meyers, W. D., 1966 Cenozoic Tectonics of the Western United States, Review of Geophysics, Volume 4, Pages 509-549.

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11. Barraclough, J. T., et al, 1967, Hydrology of the National Reactor Testing Station, Idaho in 1965, February 1967, IDO 22048, Pages 90-94.

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APPENDIX

COST ANALYSIS

I. Basis for Cost Analysis

1. Quantity of waste oil generated = 24,000 gal/year
2. Classification:
   Lubricating Oil, 99% = 23,700 gal.
   Water Soluable Cutting Oil, 1% = 300 gal.
3. Cost of new 55 gal drums = $7.50/drum
4. Salvage value of used 55 gallon drums = $1.00/drum
5. Cost of Site Services Labor = $9.00/hr.
6. Cost of Flat Bed Truck and Trailer = $4.50/hr.
7. Cost of Forklift = $3.00/hr.

II. Assumptions

1. Existing facilities have been capitalized and are available at no capital expense.
2. New facilities or additions to existing facilities will be capitalized based upon straight line depreciation over the expected life.
3. Labor costs at points of waste oil generation remain essentially the same regardless of storage alternatives considered.

III. Storage Costs

1. Storage costs for waste oil generated at CF. Oil is stored temporarily in existing 500 and 1,000 gallon sumps. No alternatives storage method will be considered.
2. Storage costs for waste oil generated at NRF and TRA.
   Option #1 Storage in used 55 gallon drums = $0/gal.
   Option #2 Storage in new 5,000 gallon underground waste oil storage tanks: 2-5,000 gallon tanks @ $1,500 = $3,000

Installation - 2 tanks	=	$2,000
Engineering	=	1,000
		$6,000

Depreciation over 20 years

$6,000/20	=	$300/yr.
$300/10,000 gal.	=	$0.03/gal.

Option #3 Storage in above grade 500 gallon Dempster Dumpster Liquid Waste Tanks.

2 - 500 gallon containers @ $217.00 = $434.00

Container life 20 years

Depreciation 434/20	=	$21.60/yr.
Maintenance	=	$20.00/yr.
		$41.60/yr.
$41.60/10,000 gal	=	$ 0.004/gal.

3. Cost of Segregation of Lubrication Oil from Cutting Oils. This segregation is currently being done at TAN where approximately 10-55 gallon drums of lube oil and 5-55 gallon drums of water soluable cutting oil are generated. No extra cost is associated with this kind of segregation. Segregation of lube oil by grades is not practical and no attempt will be made to cost storage of segregated grades of lube oil.

IV. Collection Costs

1. Collection from CF Sumps. The two CF sumps are pumped an average of once a month for each sump. The pumping requires the use of a 500 gallon Dempster Dumpster container and truck, a portable sump pump and an operator. Approximately 4 hours are required to pump the 2-sumps and transfer the waste oil to the 10,000 gallon permanent storage tank.

Labor = 1 man x 4 hr x $9.00/hr x 12/yr = $430.00

Equipment = 1 truck @ $4.50/hr x 4 hr x 12/yr = 220.00

$650.00

15,000 gallons transferred/year

then collection cost = $6.50.00/15,000 = $0.043/gal.

No alternative method appears feasible since all equipment used is existing equipment and facility.

2. Collection from TRA and NRF.

Option #1. Collection of waste oil from 55 gallon drums is the current practice. Site Services estimates that it takes 2 men one-half a day to load, transport and empty 40-55 gallon drums. Approximately 80 drums per year must be collected from TRA and NRF, for a total of 160 drums. Equipment used includes a fork lift, a lowboy trailer and truck.

Labor = 160/40 x 2 m x 4 hr x $9.00/hr	$290.00
Equipment = 160/40 x 4 hr x $3.00/hr forklift	48.00
160/40 x 4 hr x $4.50/hr truck	72.00
	$410.00 yr

$410.00/9,000 gal. = $0.045/gal.

Option #2. Collection from new 5,000 gallon storage containers. Pickup once a year each from TRA and NRF. Use 5,000 gallon oil tank mounted on lowboy trailer and portable sump pump. Pump sumps at a rate of 35 gpm. Assume 3 hours required for each sump or a total of 6 hours.

Labor = 1 man x 6 hrs x $9.00	=	$54.00
Equipment = 1 truck & trailer x $4.50 x 6 hr.	=	$27.00
Transportation 8 miles x 2 trips x 0.385/miles	=	$ 8.00
		$77.00

$77.00/10,000 gal ≈ $0.0077/gal.

Option #3. Provide 500 gallon Dempster Dumpster containers at TRA and NRF. Pick up containers 20 times per year for a total of 10,000 gallons of oil at approximately 2 hours/pick up, dump and return.

Labor 1 x 2 hr x $9.00 x 20	=	$360.00
Equipment 2 hr x $4.50 x 20	=	$180.00
		$540.00/year

540/10,000 = $0.054/gallon

V. Transportation

Assume an average speed of 35 mph from NRTS to Idaho Falls, Blackfoot, Pocatello or Salt Lake City and loading time from 10,000 gallon waste oil storage tank to 8,000 gallon oil tanker = 1 1/3 hours at a rate of 100

gallon per minute. Cost per mile = ($9.00/hr + $4.50/hr)/35 mph = $0.385/mile

Driver and equipment standby time =

($9.00 + $4.50) x 1 1/3 hour = $18.00

Round Trip Idaho Falls to NRTS and return = 100 miles

Round Trip Blackfoot to NRTS and return = 80 miles

Round Trip Pocatello to NRTS and return = 130 miles

Round Trip Salt Lake City to NRTS and return = 470 miles

1. Cost of Transportation for Market at -

Idaho Falls (100 x 0.385) + $18.00 = $56.50 or $0.0071/gal

Blackfoot (80 x 0.385) + $18.00 = $48.80 or $0.0061/gal

Pocatello (130 x 0.385) + $18.00 = $68.00 or $0.0085/gal

Salt Lake (470 x 0.385) + $18.00 = $199.00 or $0.025/gal

2. Cost of transportation for application on Dirt Road, loading from 10,000 gallon tank to 5,000 gallon spreader

@ 100 gpm = 50 minutes. Say 1 hour.

Distance to burial ground road = 3 miles, round trip distance = 6 miles.

Labor standby $9.00/hr x 1 hr	=	$9.00
Equipment standby $4.50 x 1 hr	=	$4.50
Round Trip 6 x 0.385	=	$2.30
		$15.80/5,000 gallons

$15.80/5,000 = $0.0032/gallon

3. Cost of transportation to incineration at CPP. Round trip distance the same as for road application at Burial Ground. Assuming a 5,000 gallon storage tank at CPP, the transportation cost will be the same as for road oil application of $0.0032/gallon.

4. Use at CF-688 and 662 as Fuel Oil Supplement

Round Trip mileage 2 x 0.385/mile	=	$ 0.77
Labor and Equipment Standby	=	13.50
		$14.27

or $14.27/5,000 gallons = $0.0029/gallon

VI. Disposal

1. Commercial Outlet for Reclaiming of Waste Oil Per Walt Rohweder

contact with Economy Oil Company in Salt Lake: E.O.C. will charge a minimum of 2¢/gallon to pick up waste oil from NRTS. The charge includes transportation and disposal.

Cost = $0.02/gallon

or based on 21,500 gallons x $0.02 = $430.00/year

2. Treatment of Unpaved Roads at NRTS

Spreading costs - Site Services estimates 2 hours of labor and equipment required to spread 5,000 gallons of waste oil. Requires driver plus helpher. Then

$$\text{Labor} = \frac{21{,}500 \text{ gal}}{5{,}000 \text{ gal}} \times 2\text{m} \times 2 \text{ hr} \times \$9.00 = \$155.00$$

$$\text{Equipment} = \frac{21{,}500}{5{,}000} \times 2 \text{ hr} \times \$4.50 = \$ 39.00$$

$$\$194.00$$

194.00/21,500 gallons = $0.009/gal

Coverage - Driving at a rate of 2 miles per hour and spreading an 8-foot width, 5,000 gallons cover 4 x 5,280 ft x 8 ft = 169.000 SF or 169,000/5,000 = 34 SF/gallons

Cost per square foot of surface treatment equals

$$\frac{\$0.009/\text{gal}}{34 \text{ SF/gal}} = \$0.0003/\text{SF}$$

3. Use of CaCl for treatment of unpaved roads.

Cost of CaCl per ton = $250.00/ton or $0.125/#

100# bag spreads over 75 ft of road by 12 ft wide

Cost of application (Material only) =

$$\frac{100\# \times \$0.125/\#}{75 \text{ ft} \times 12 \text{ ft}} = \$0.014/\text{SF}$$

Cost of application from flat bed truck with spreader and manual loading of 100# sacks to spreader at the rate of one sack per minute.

Coverage rate = 900 SF/minute or 54,000 SF/hr

Labor = 2 m x $9.00 x 1 hr = $18.00

Equipment = truck x 1 hr x $4.50 = $ 4.50

$22.50

Spreading Cost = $22.50/54,000 = $0.00042/SF

Total Cost/SF = 0.00042 + 0.014 = $0.01442/SF

Cost oil vs. CaCl = 0.01442-0.0003 = $0.0141/SF

@ 34 gal/SF x 21,500 gal = 730,000 SF/hr treated road

730,000 x $0.0141 = $10,300/yr added cost if CaCl is

used on dirt roads rather than oil

4. Use of Waste Oil as Fuel Oil (Blend with No. 5 Fuel Oil)

CF-688 Boiler Plant used 40,000 gallons/year of No. 5 fuel oil, if waste oil blended at ratio of 1.9, then 4,000 gallons of waste oil could be blended with 36,000 gallons of No. 5 fuel oil. Blending would be accomplished with existing recirculation pumps.

Labor cost to deliver waste oil

Use 5,000 gallon tank and lowboy truck. Cost to transfer oil assumed to be the same as to deliver oil for surfacing road.

Cost = $0.0023/gal = 5,000 x 0.0023 =	$11.50
Cost of 5-filter cartridges per loading operation	17.50
Filter prorated over 10 years $112.00/10 yr	11.20
	$40.20

Savings (cost of fuel oil replaced) - Operating cost)

4,000 gal x $0.0897/gal - $40.26 = $360.00 - 40.00 = $320.00

Expense (cost of CACL required to replace road oil)

4,000 gal x 30 SF/gal x 0.0141/SF ≈ $1,700

CF-662 uses 160,000 gal/yr, has 5,000 gpm storage tank, could take 500 gallons of waste oil mixed with 4,500 gallons No. 5 fuel oil.

Cost to deliver oil - take direct from the sump to CF-662 using 500 gallon Dempster Dumpster. Cost stand off delivering to 10,000 gallon storage tank or 5,000 gpm No. 5 fuel storage tank. Modifications required to CF-662 to allow using waste lube oil are as follows:

2 - 5 HP recirculation pumps, 2 x $200	=	$400.00
2 - 5 HP motors, 2 x 80.00	=	$160.00
1 - Set manifolding, materials $100.00	=	$100.00
1 - Filter assembly, Bendix series 7500	=	$112.00
2 - Sets block valves, relief and selection	=	$150.00
Installation 80% cost of materials	=	$738.00
		$1,660.00
Modifications to Storage Tank		$1,000.00
Evcavate and Replace Fill		$ 500.00
		$3,100.00
Engineering 50% of L&M		$1,580.00
		$4,740.00

Contingency 50% of Subtotal $2,370.00

$7,110.00

Prorate over - 10 years

Cost of plant modifications = $711.00/year

Cost of filters 1 set of 5 per 5,000 gallon 17.50

$728.50

Savings due to use of Waste Oil

16,000 gallons x $0.0897/gal = $1,440.00

Cost = Savings of 1440 - 728 = $ 712.00/year

Total cost savings (due at CF-688 and 662) = 320

712

$1,032.00/year

Total savings by using oil as fuel = $1,072/year

Added cost of CaCl for road treat = -$10,300

Σ Cost = $ 9,228

5. Incineration of Waste Oil

Option #1. New Incineration Facility, with 20 gallon/hour capacity, operated 4 days per week, 52 weeks per year. 2 Manhours per day required for startup, checkout of automatic operation and shutdown operation at end of day. Assume 6 hours per day of capacity operation.

Then 6 hr x 4 day x 52 we/yr x 20 gal/hr = 25,000 gal/yr OK

Labor = 2 hr/day x $9.00 x 4 day/wk x 52 wk/yr = $3,700.00/yr

Facility Cost

1	- Furnace 20 gal/hr w/liner	$2,500
1	- Auxiliary Fuel System	1,000
2	- Waste Oil Pumps & Motors (1/2 gpm)	200
1	- 5,000 gal. waste oil storage tank	1,500
1	Set Controls	3,000
	Piping and Valves including Instrument	5,000
	Stack (12" Steel)	2,000
2	- Blowers (600 SCFM)	
	(@ 20% Excess Air 211 SCF/#oil)	1,000

$\frac{20 \text{ gph} \times 8\#/\text{gal}}{60 \text{ m/hr}} = 2.6\#/\text{min}$

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Contingency 50% of Subtotal	$2,370.00
	$7,110.00

Prorate over - 10 years

Cost of plant modifications	=	$711.00/year
Cost of filters 1 set of 5 per 5,000 gallon		17.50
		$728.50

Savings due to use of Waste Oil

16,000 gallons x $0.0897/gal = $1,440.00

Cost = Savings of 1440 - 728 = $ 712.00/year

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Then 6 hr x 4 day x 52 we/yr x 20 gal/hr = 25,000 gal/yr OK

Labor = 2 hr/day x $9.00 x 4 day/wk x 52 wk/yr = $3,700.00/yr

Facility Cost

1 - Furnace 20 gal/hr w/liner	$2,500
1 - Auxiliary Fuel System	1,000
2 - Waste Oil Pumps & Motors (1/2 gpm)	200
1 - 5,000 gal. waste oil storage tank	1,500
1 Set Controls	3,000
Piping and Valves including Instrument	5,000
Stack (12" Steel)	2,000
2 - Blowers (600 SCFM)	
(@ 20% Excess Air 211 SCF/#oil)	1,000

$\frac{20 \text{ gph} \times 8\#/\text{gal}}{60 \text{ m/hr}} = 2.6\#/\text{min}$

Attachment 5

Subject: Administrative Memo (Form EG&G-853A), notice to personnel that only used oil will be accepted at the CFA oil collection station.

Date: April 10, 1980

From: J. R. Dubay, EG&G Idaho, Inc.

To: EG&G Idaho, Inc., Personnel

administrative

MEMO

Policy and Procedure

Vol. 2, No. 38 April 10, 1980

DISPOSAL OF USED OIL

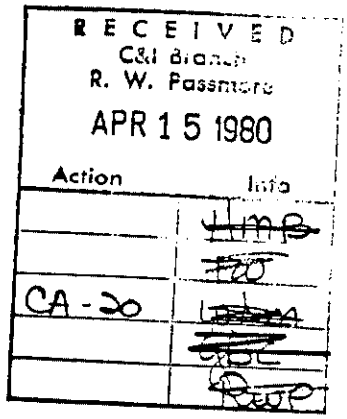
Recently, used oil drums have been sent to the CFA Tank Farm that contain gravel, rubber gloves, antifreeze, chemicals, and unknown agents.

Effective immediately, used oil is the only material that can be accepted at the oil collection station at the CFA Tank Farm. Before drums can be transported, the shipper must prepare a Safe Work Permit, Form EG&G-17, detailing the origin of the material, describing the contents, giving the destination, and identifying each drum. All other items in drums must be disposed of in accordance with existing procedures.

Please call Jay D. Green, Manager, Stores and Warehousing, ext. 6-2421, if additional information is needed.

—J. R. Dubay, Director
Materiel

SDL-A3-235



R W PASSMORE
BLDG WMU ROOM 601
RWMC

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Attachment 6

Subject: Administrative Memos (Form EG&G-853A), notice to personnel that safe work permit is required to dispose of waste oil at the CFA oil collection station.

Date: June 27, 1980

From: J. R. Dubay, EG&G Idaho, Inc.

To: EG&G Idaho, Inc., Personnel

administrative

MEMO

Policy and Procedure

Vol. 2, No. 52 June 27, 1980

DISPOSAL OF USED OIL

Reference: Resource Manual, p. 4-14, "Used Oil"

The paragraph entitled "Used Oil" in the 6/20/80 issue of Section 4 incorporates and supersedes Policy and Procedure Memo, Vol. 2, No. 38.

Since issuance of the revised Section 4, a new form, Waste Oil Disposal, Form EG&G-464, has been created for submitting used oil to the CFA Tank Farm. Please cross out "Safe Work Permit, Form EG&G-17" and note this new form and the volume and number of this memo at the beginning of the referenced paragraph in your copy of the Resource Manual.

You are reminded that used oil being turned in must not contain additives such as antifreeze, solvents, acids, or trash.

If additional information is needed, contact Jay Green, Manager, Stores and Warehousing, ext. 2421.

—J. R. Dubay, Director
Materiel

SDL-A3-334

EG&G Idaho, Inc.

FORM EGG-2631#

(Rev. 01-92)

Attachment 7

Subject: Interoffice Correspondence EG&G Idaho, Inc., draft procedure for disposal of ethylene glycol and cutting oils.

Date: July 30, 1980

From: R. W. Passmore, EG&G Idaho, Inc., Pass-71-80

To: J. R. Fielding, EG&G Idaho, Inc.

EG&G Idaho

CA-50 25

INTEROFFICE CORRESPONDENCE

date July 30, 1980

to J. R. Fielding/R. V. Dye

from R. W. Passmore R. W. Passmore

subject ETHYLENE GLYCOL & WATER SOLUBLE CUTTING OIL WASTES - Pass-71-80

Ref: (a) Administrative Memo Vol. 2, No. 52, "Disposal of Used Oil", Jun 27, 1980
(b) Safety Manual Procedure 11030, Revision 2, "Nonradioactive Waste Management", Jul 10, 1980

Reference (a) prohibits the past practice of placing ethylene glycol (antifreeze) in waste oil and reference (b) requires a written request for disposal of special wastes not covered in existing procedures. The restrictions of references (a) and (b) will result in an accumulation of used ethylene glycol without an approved procedure for its disposal. Water soluble machine cutting oil wastes are in a similar position. As these two waste products are accumulated on a continuing, if not a regular, basis there is a need to provide for an approved disposal method.

Investigation by Industrial Hygiene as well as Waste Management did not reveal any unusual hazard with either substance. One exception where a significant hazard could exist would be if nitrosamines (a carcinogen) were present in the water soluble cutting oil waste. The principle sources for these materials are the CFA Big Shop and the TAN Machine Shop. The investigation also failed to produce any documented approved disposal method.

An approved procedure for disposal of the subject wastes will help ensure that the mixing of used antifreeze with waste oil will not occur. It will also negate the need for a special written request each time the need for disposal of the subject wastes arises. I have prepared a draft procedure (attached) for your consideration which will use these wastes as a dust suppressant on INEL gravel or dirt roads. No objections were raised in verbal discussions with EG&G and ID Industrial Hygiene with this method of disposal. I propose that the attached draft procedure be issued as a Safety Manual procedure and incorporated in the Services, Maintenance, and Operations Standard Practices.

Attachments:
As stated

FORM EG&G 954 cc: J. R. Dubay W. G. Hathaway J. E. White

EG&G Idaho, Inc.

SAFETY MANUAL

Title: DISPOSAL OF ETHYLENE GLYCOL AND WATER SOLUBLE CUTTING OIL WASTES

No.:

Page 1 of 3

Date:

Approved:

DRAFT

LEGEND
* REVISION
# ADDITION

Reviewed By:

1.0 PURPOSE:

To establish the responsibilities and practices for the collection and disposal of used/expended ethylene glycol and water soluble machine cutting oils.

2.0 DEFINITIONS:

2.1 Ethylene Glycol Waste: Used or expended nonradioactive antifreeze.

2.2 Water Soluble Cutting Oil Waste: Used nonradioactive water soluble cutting oils.

CAUTION: Water soluble cutting oils which contain nitrosamines cannot be disposed of by this procedure. Cutting oils containing nitrosamines must be disposed of in accordance with Safety Manual (SM) Procedures 6020, 11030, and 11050.

3.0 PRACTICE

Responsibilities		Action
3.1 Generator	.1	Accumulates the used ethylene glycol or water soluble machine cutting oil in 55-gallon (208.2 l) metal drums. The drums must be labelled either: "Used Ethylene Glycol" or "Used Water Soluble Cutting Oil -- NO NITROSAMINES".

SAFETY MANUAL	Title: DISPOSAL OF ETHYLENE GLYCOL AND WATER SOLUBLE CUTTING OIL WASTES	No.:
		Page 2 of 3
		Date:

.2 When accumulation drum(s) is/are full, request Services Maintenance and Operation Branch to pick up the full drum(s) for disposal.

.3 Request radiological survey of the waste drum(s).

.4 Complete EG&G Form 130 "Nonradioactive Waste Log".

3.2 Safety Division

.1 Perform radiological survey of the ethylene glycol or machine cutting oil waste and the 55-gallon (208.2 l) drum container.

.2 Issue "Green Tag" to authorize removal, if the radiological survey is satisfactory.

3.3 Services Maintenance and Operations Branch

.1 Pick up waste ethylene glycol or water soluble machine cutting oil.

.2 Spread the waste ethylene glycol or water soluble cutting oil on selected dirt or gravel roads for dust suppression.

SAFETY MANUAL	Title: DISPOSAL OF ETHYLENE GLYCOL AND WATER SOLUBLE CUTTING OIL WASTES	No.: Page 3 of 3 Date:

.3 Record disposal location on EG&G Form 130 "Nonradioactive Waste Log". Example: CFA - xyz road.

.4 Distribute copies of EG&G 130 form "Nonradioactive Waste Log" in accordance with instructions on form.

3.4 Generator

.1 Report the volume of ethylene glycol or water soluble cutting oil disposed via the ID-136 form, "Industrial Waste Form", for the month in which the disposal occurs.

Attachment 8

Subject: Memo of Conversation, personnel interview with Dave Dahlquist on past disposal of waste oil, oil filters, solvents, and other CFA shop waste.

Date: April 14, 1993 (Form EG&G-561)

Interviewer: Steven H. McCormick, EG&G Idaho, Inc.

Interviewee: Dave Dahlquist, EG&G Idaho, Inc.

EG&G Idaho, Inc.

Form: EG&G-561

MEMO OF CONVERSATION

Person Calling: Steve McCormick — Date: April 14, 1993

Representing Org: WAG 4 — Time:

Person Called: Dave Dahlquist — Phone No. 526-2252

Representing Company: CFA Shop, EG&G Idaho, Inc.

Subject: Past disposal practices at CFA Shop.

I spoke with Dave about disposal information in the Industrial Nonradioactive Waste Information System (INWMIS) and past operations at the CFA shops.

Dave was aware of the general types of wastes disposed to CFA Landfills II & III from the CFA shop areas. Much of the waste disposed would have gone into dumpsters or other waste containers that would have been hauled to the landfills for disposal. These waste would have likely been categorized under the trash and sweepings category of the INWMIS database. The list should not be considered to be a complete assessment of wastes disposed from the CFA shop. Wastes: brake linings, tires, scrap metal (aluminum, steel and other), cables, wheels, insulation, glass, ballasts from light fixtures, light tubes, batteries, pesticides, plastic, oil filters, empty drums & containers, empty spray cans.

Dave indicated the filters would have included the large type from diesel engines and smaller filters from cars and pickup trucks. The oil filters would have been disposed without being crushed or drained in a 4 cu yd dumpster directly to the ground.

Dave indicated that the sump sludge delivered to the landfill would have come out of the sumps shown on the figure attached (taken from the Motor Pool Pond RI report). These sumps were cleaned periodically and the wastes disposed to the landfill. The sump sludge may have been disposed in a container or directly to the ground. The sumps, which are below floor concrete containers, retain solids, oil, grease, and other materials before they are carried by the sewage system to the CFA sewage plant.

We discussed the types of solvents used in the CFA shops. 111 Trichloreathane was used in a parts washer which discharged to the sump and sewage system. Dave also mentioned other types of solvents such as carburetor cleaners.

Additional Information:

Dave now is the environmental coordinator for the CFA shop area. When he took this position in 1989 he began a program to track wastes and eliminate hazardous materials from the operations. A process waste assessment (PWA) is attached which details hazardous materials eliminated from the shop during the past few years. The wastes described in the PWA may indicate types of wastes disposed in the landfills from 1970 to 1984.

Steven H. McCormick 4/14/93

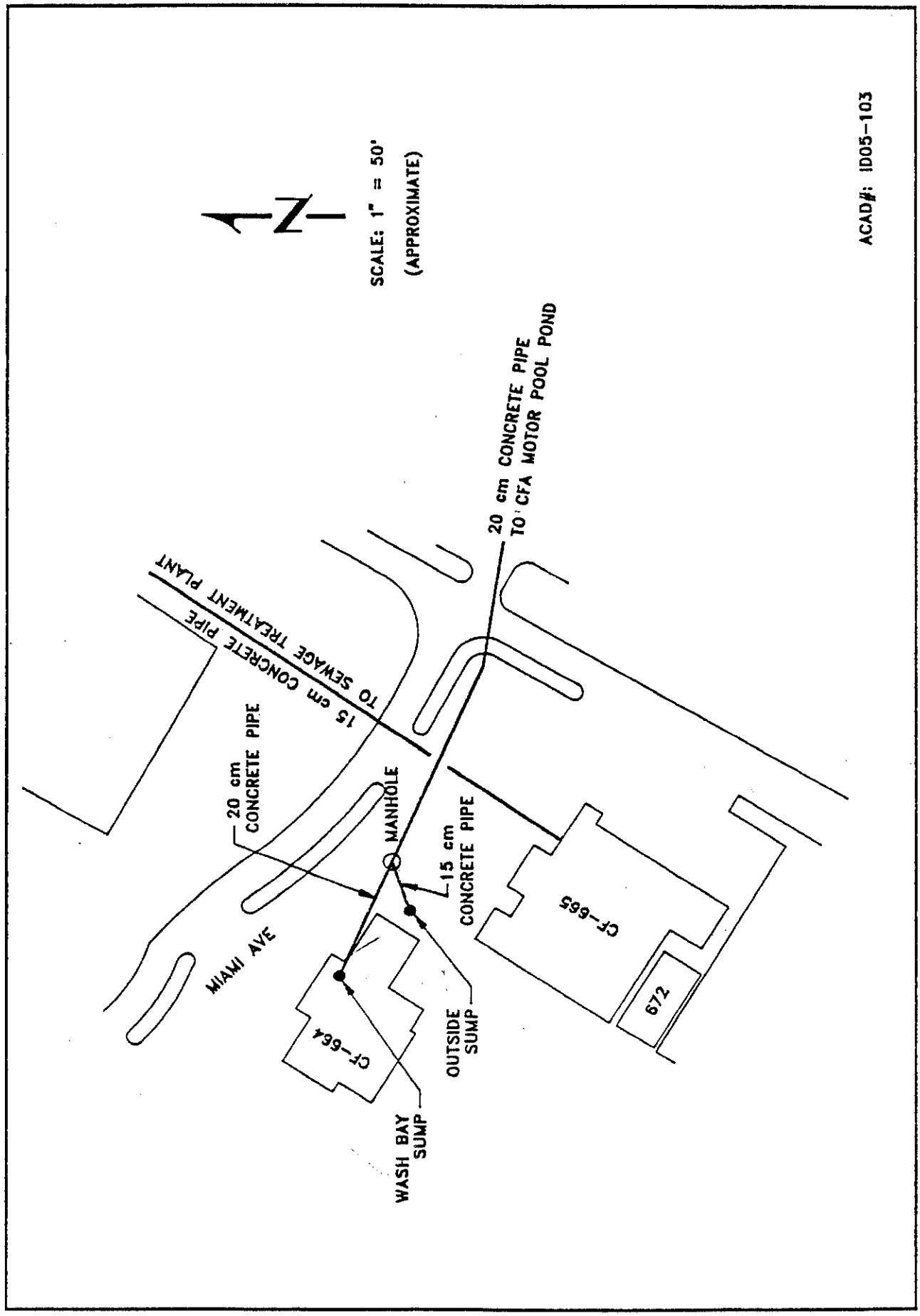


Figure 1-3. CF-664 waste sumps and piping leading to the CFA Motor Pool Pond.

Attachment 9

Subject: Interoffice Correspondence on disposal of sludge from the CFA steam cleaning facility (CFA shop) to the southeast end of Lansing Avenue.

Date: October 8, 1971

From: R. B. O'Brien, Aerojet Nuclear Company

To: W. Koutnik, Aerojet Nuclear Company

Aerojet Nuclear Company

Interoffice Correspondence

October 8, 1971

Dumping of Sludge
OB-397-71

W. Koutnik
CF 607

On Wednesday, October 6, our Industrial Hygiene and Waste Reporting Section received a call from the ID Waste Management Branch to report that a pile of sludge had been dumped in the sagebrush in the vicinity of the southeast end of Lansing Avenue (CFA).

ID's call was investigated and found to be true. Followup by Mr. A. L. Olsen resulted in arrangements for removal of the sludge to the CFA Sanitary Landfill for disposal. With the present heavy emphasis on environmental preservation, we must not allow incidents like this to happen in the future. In this case, the fact that the sludge was settled grime and dirt from vehicles processed through the CF steam cleaning facilities in no way permits it to be disposed of except through approved channels.

In order to avoid future incidents of this type, it is recommended that all Site Services personnel be made aware of the following regulations:

1. All liquid and solid wastes must be disposed of by approved methods. In no case shall waste liquids or solids be disposed of haphazardly to the environment.

2. If the proper disposal method and location are not known, this information can be obtained from the Waste Handling Section of the ~~Nuclear Technology~~ Division or the Industrial Hygiene Section of the NOS Division.

3. All wastes must be reported. Information as to the correct method of reporting may also be obtained from the sources in 2, above.

I hope that ID does not push this incident any further. It is certain that they will employ more intensive followup and surveillance of our operations if they are able to discover additional instances of violation of waste management regulations.

RBO:jsw

R. B. O'Brien

cc: D. D. Coward
J. A. Hanny
W. W. Hickman
J. W. McCaslin
A. L. Olsen
R. B. O'Brien - 2

Attachment 10

Subject: Letter on disposal of heavy sludge and fuel oil for dust suppression roads.

Date: October 19, 1979

From: S. G. Smolen, Exxon Nuclear Ida

To: J. H. Barry, U. S. DOE-ID

EXXON NUCLEAR IDA

P.O. Box 2800
IDAHO FALLS, IDAHO 83401

Telephone 208-526-0677

:tober 19, 1979

Sludge Removal and Disposal
SGS-40-79

Mr. J. H. Barry
U. S. Department of Energy
Idaho Operations Office
550 2nd Street
Idaho Falls, Idaho 83401

Dear Mr. Barry:

A. L. Olsen, EG&G Maintenance, has agreed to remove and dispose of approximately 10,000 gallons of heavy sludge from fuel oil storage tank VES-FOS-681.

The sludge will be removed from the tank by pump and/or bucket and put into a leak-proof dumpster for transport to CFA.

At CFA the sludge will be dumped on the ground, mixed with dirt and used for dust control on selected dirt roads.

It is important that this work be completed by October 31, 1979 and it cannot start until we have your approval.

If you have any questions, please contact J. D. Soderberg at 526-3242 or O. L. Olsen at 526-2432.

Sincerely,

J. L. McSween

for S. G. Smolen, Vice President
Production Department

jjs

cc: K. A. Carlson, DOE
R. K. Grant, EG&G
A. L. Olsen, EG&G
R. W. Tassmore, EG&G

WASTE OIL TO THE LANDFILL?

Attachment 11

Subject: Safety Appraisal of EG&G Idaho Chemical Disposal Practices

Date: July 1980

From: Industrial Hygiene Section, EG&G Idaho, Inc.

SAFETY APPRAISAL OF

EG&G IDAHO CHEMICAL
DISPOSAL PRACTICES

BY

THE INDUSTRIAL HYGIENE SECTION

EG&G IDAHO CHEMICAL DISPOSAL PRACTICES

PURPOSE AND SCOPE

(1) To identify current EG&G standard practices for the disposal of chemicals at the INEL.

(2) To identify EG&G locations where chemicals are used at the ENEL.

SUMMARY

This appraisal was conducted during the months of May and June, 1980. The chemicals identified in this report are considered to be the ones most used at the INEL. A more detailed listing can be obtained from the Industrial Hygiene files for each area. The recommendations concerning the Hazardous Material Disposal Area (HMDA) are considered to be very important.

This note: stopped per admin memo Vol 2 #52 dated 6/27/80

CENTRAL FACILITIES AREA

CFA-654 Craft Shops

Materials: Cleaning solvents

Disposal: Taken to Fire Department burn pit.

CFA-664 & 655 Service Station & Big Shop

Materials: Oil, anti-freeze, battery electrolyte, steam cleaner wastes (detergents), car wash wastes (detergents), degreaser solvents, and parts washer solvents.

Disposal: Used oil is (1) hauled to the waste oil holding tank where it is stored until it is sold for recycling, (2) sent to TAN to be mixed with fuel oil and burned in the boilers, or (3) sent to the Fire Department burn pit.

Used anti-freeze is presently being dumped in with the used oil.

Steam cleaner wastes empty into a sump tank which has a drain line running to a disposal pit south of the Central Facilities area. The sump tank is cleaned periodically. The sludge is disposed of in the CF Landfill.

Used battery electrolyte is dumped down a drain in the battery room. This drain is connected to the steam cleaner sump tank.

Car wash wastes drain into the steam cleaner sump tank.

Liquid wastes from the vapor degreaser are dumped in with the used oil. The sludge is disposed of in the CF Landfill.

Used solvent from the parts washers are dumped into the steam cleaner sump tank.

CF-688 & 689

Materials: There are a variety of chemicals used in these facilities. They are separated into the following categories for disposal purposes: (1) Ammonium Hydroxide, (2) Sodium Persulfate, (3) Resist, Developer, (4) Organic Acids, (5) Mineral Acids.

Disposal: The waste containers consist of polyethylene liners inside metal drums. The drums are labeled on the tops and sides and are stored in a fenced area adjacent to CF-688. Warning signs are posted on the fence and a roof is being constructed over this area. When the drums are full, they are transported to the Hazardous Material Disposal Area (HMDA) for interim storage until they are shipped to Wes-Con for final disposal.

TSA

Materials: There is a small amount of solvent waste generated at the copy center.

Disposal: The solvent is sent to the HMDA until it is disposed of.

TEST REACTOR AREA

TRA-666

Materials: Nitric Acid

Disposal: Cold drain

TRA 642 & 645

Materials: Sodium Hydroxide, Chlorine, Sulfuric Acid.

Disposal: Warm waste/pond.

TRA-603 Basement

Materials: Hydrofluoric Acid, Aluminum Nitrate, Nitric Acid, Hydrochloric Acid, Sulfuric Acid, 1,1,1,-Trichloroethane, Alcohols, methachlor.

Disposal: Generally down sink and to warm waste.

TRA-604 Labs

Materials: Nitric Acid, Flurosulfuric Acid, Sulfuric Acid, Hydrochloric Acid, Hydrofluoric Acid, Sodium Chlorate, Sodium Nitrate, Sulfur Dioxide, Bromine Pentafluoride, Chlorine, Fluorine, and numberous other chemicals.

Disposal: Generally down the sink, and to warm waste.

TRA-653

Materials: Sanipro

Disposal: Cold drain

TRA-653 Electrical

Materials: SS-25 Solvent, Alcohols, Acetone, Methanol.

Disposal: The solvent is loaded in used oil drums and then sent to CFA. The Alcohols, Acetone, and Methanol are used as cleaning materials. The soaked rags are sent to the CFA Landfill.

TRA-641

Materials: Methylene Chloride, Chloroform, Hexane, Methyl Alcohol.

Disposal: Down the sink, and to warm waste.

TRA-632 Lab

Materials: Sulfuric Acid, Acetic Acid, Phosphoric Acid, Hydrochloric Acid, Nitric Acid, Methyl Alcohol, Trichloroethane, Sodium Hydroxide.

Disposal: These materials are used in an etching process. The waste is washed down the sink, and to the warm waste.

TRA-661 Lab

Materials: Acetone, Nitric Acid, Hydrochloric Acid, Sulfuric Acid, Nitrobenzene, and numerous other chemicals.

Disposal: Down the sink, and to the warm waste.

TRA-670 Lab

Materials: Acetone, Acetic Acid, Hydrofluoric Acid, Hydrazine Hydrate, Ammonium Hydroxide, Nitric Acid, Sulfuric Acid, Hydrochloric Acid, Methanol, Hydrogen Peroxide, Carbon Tetrachloride, Benzene, and numerous other chemicals.

Disposal: These materials are sent to the sink, or warm waste, or loop water, and some are sent to the HMDA.

TRA-671

Materials: Sulfuric Acid, Slimicide J-12, Betz Inhibitor 546, Betz Deposit Control 430.

Disposal: Secondary water goes to the TRA disposal well.

TRA-608

Materials: Sodium Hydroxide, Nitric Acid, Sulfuric Acid.

Disposal: Blown down and drainage goes to the north chemical disposal pond.

TRA-645

Materials: Sulfuric Acid, Betz Polynodic 606, Slimicide J-9.

Disposal: Secondary water goes to the TRA disposal well.

TRA-661 Labs

Materials: Nitric Acid, Ammonium Hydroxide, Dioctyl Phthalate, and numerous other chemicals.

Disposal: Down the sink, and to the warm waste.

TRA-670

Materials: Sodium hydroxide, Nitric Aicd, Chlorothene NV, Stoddard Solvent, Mineral Spirits, Alcohols, 1,1,1,-Trichloroethane.

Disposal: The Sodium Hydroxide and Nitric Acid are sent to the warm waste or leaching pond. The rest of the materials are used in the machining process and the excess rags are sent to the CF Landfill.

TEST AREA NORTH

TAN-604

Materials: Banvel, Spike, Bromacil, Pyrethrins, Pramitol, Diazinon, Toluamide, Triazole, 2,4-D, 2,4,5-T, Round Up.

Disposal: These materials are used in insect, soil, or weed treatment. All unused chemicals will be sent to HMDA.

TAN-607

Materials: Nitric Acid, Tri-Sodium Phosphate, Propanol, Stoddard Solvent, Chlorine, Sodium Hydroxide, Sulfuric Acid, Glacial Acetic Acid, Zinc Bromide, Acetone, Tri-chloroethylene, Methanol, Cutting Fluids.

Disposal: The above materials are sent to the leaching pond, or Hot Waste, or CFA Landfill, or surplused.

WRRTF 641/645

Materials: Amerzine, Sodium Sulfite, Sodium Hydroxide, Sulfuric Acid, Silicone, Di-Sodium Phosphate, Freon 12.

Disposal: Materials are sent to leaching pond or to the HMDA.

LOFT 630/650

Materials: Sulfuric Acid, Boric Acid, Sodium Sulfite, Tri-Sodium Phosphate, Sodium Hydroxide, Sodium Chloride, Di-Sodium Phosphate, Hydrazine.

Disposal: Hot waste, warm waste, and sanitary system.

PBF, SPERT & ARA AREAS

SPERT-613

Materials: Sodium Hydroxide, Methyl Chloroform, Trichloroethane, Nitric Acid, Powdered Aluminum.

Disposal: All items sent to hot waste.

ARA-607, 613, 622, 626, 627

Materials: Nitric Acid, Hydrochloric Acid, Chlorothene, Acetone, Potassium Hydroxide, Sulfuric Acid, Acetic Acid.

Disposal: Materials sent to septic tank and leaching pond.

PBF - T-13

Materials: Alumina, Ammonium Citrate, Sulfamic Acid, Potassium Permanganate, Soda Ash, Sodium Hydroxide, Sodium Sulfite, Trisodium Phosphate, Disodium Phosphate.

Disposal: Items above are used in laboratories. Used materials are sent to holding tank and then to CPP.

PBF-620

Materials: Iodide crystals, Starfomic Indicator, Sulfamic Acid, Sodium, Molybdate Reagent, Stanneous Reagent, Phenolphein Indicator, Potassium Iodide, Nitric Acid.

Disposal: Above items are sent to holding tank and then to CPP.

PBF-601

Materials: Ammonium Hydroxide, Sulfuric Acid, and Chromates.

Disposal: Items sent to warm waste injection well or holding tank and then to CPP. Chromates are sent to evaporation pond.

RECOMMENDATIONS

(1) The HMDA should be under the direction of Waste Management, and not under CF Facilities Services & Maintenance.

(2) A location should be designated in each area (TAN, TRA, CFA, etc.) as a "HMDA Pick-Up Area". The area should be fenced and should be set up to handle temporary storage. The chemicals or items should be picked up on a monthly basis from each area.

(3) A new location for the HMDA should be investigated. The present location has the following problems:

   (a) Access to the area during the winter months is limited.

   (b) Explosives are known to be buried in the terrain.

   (c) Access to the area is dependent on the use of the DOE Gun Range.

(4) Amount of paperwork should be minimized. At the present time, it is easier to pour a small quantity down a sink or dump it out in the desert than complete numerous forms for proper disposal.

(5) Unwanted chemicals are sometimes included with other items to be excessed. These chemicals then have to be removed and handled separately, since hazardous materials can not be released for public sale. A method for assessing the originating organization for the disposal costs should be established.

(6) There appears to be a lack of understanding by the operational groups on the proper disposal of chemicals. They should be alerted to follow the standards in the EG&G Safety Manual (Sections 6020, 8010, 11030, 11050), and I.D. Standard Operational Safety Requirements #0550.

Attachment 12

Subject: Memo of Conversation on past operations at CFA Landfill II and disposal of oil in the borrow pit at the east end of Lansing Blvd.

Date: November 4, 1993

Interviewer: Jim Crandall, EG&G Idaho, Inc.

Interviewee: Lee Mangum, EG&G Idaho, Inc.

MEMO OF CONVERSATION

INTERVIEWER: Jim Crandall

REPRESENTING ORG: U.S.E.P.A. TIME: 8:55 AM: X PM: ___

INTERVIEWEE: Lee Marquez S# 34665 DATE: 11/4/93

REPRESENTING ORG: F&M Heavy Equipment Operator

SUBJECT: (1) Landfill #2 - Questions about actual operations during the filling of the landfill.

(2) Oil burning site in ditch near the end of Fanning Street at CTA

SIGNATURE: [signature]

CONVERSATION: Question: Was open burning performed at Landfill #2.

Lee: I don't think so. All the burning I can remember was at Landfill #1.

Question: Was White oils, sludges, and/or solvents disposed in Landfill #2.

Lee: Yes, the big drop sludge and oils from NRF went into the landfill.

Question: Do you know of any oils, sludges, and/or solvents that might have been dumped into the borrow pit near the east end of Fanning Street at CTA?

Lee: Yes it was common practice for the big shops to

Lee Mangum
(Cont) page 2

11/4/93

MEMO OF CONVERSATION

CONTINUATION SHEET

CONVERSATION: Clean out their pits and dump the sludge in the borrow pit.

Question: Is there any other place used oil and sludge could have been dumped?

Lee: Yes. Used oil was used to control dust on the unpaved roads at the INEL.

Question: When?

Lee: All throughout the 1970 and the early 1980's.

Question: How much oil went on the roads?

Lee: It was collected and used during the summer and fall. The oil the unit by the landfill was taken we didn't need it for the roads.

Attachment 13

Subject: Memo of Conversation on past operations at CFA Landfill II and disposal of oil in the borrow pit at the east end of Lansing Blvd.

Date: November 4, 1993

Interviewer: Jim Crandall, EG&G Idaho, Inc.

Interviewee: Fred Olsen, EG&G Idaho, Inc.

MEMO OF CONVERSATION

INTERVIEWER: Jim Crandall

REPRESENTING ORG: WAG-4 TIME: 7:15 AM: X PM: ___

INTERVIEWEE: Fred Olsen S# 23788 DATE: 11/4/93

REPRESENTING ORG: F&M Heavy Equipment Operator

SUBJECT: (1) Landfill #2 - Questions about actual operations during the use of the landfill

(2) Oil dumping site in ditch near the east end of Lansing St at C-ta

SIGNATURE: Jim Crandall

CONVERSATION: Question: Was there any open burning in landfill #2 during the time you were assigned there?

Fred: No. I don't remember any at Landfill 2.

Question: Were waste oils and/or solvents disposed or burned at landfill 2.

Fred: Not burned, but there were waste oil & sludges disposed there on a regular basis. There is a large concentration in one area. (See sketch — he pointed out the general location).

Question: Do you know of any waste oils, sludges, and/or solvents disposed or dumped in the borrow pit along the east end of Lansing?

11/4/93

Fred Olsen
(cont) page 2

MEMO OF CONVERSATION

CONTINUATION SHEET

CONVERSATION: Fred: Yes, it was a general practice years ago. I think most of the stuff came from the Big Sky. Talk to Pete DePue. He ran the tank truck during that time.

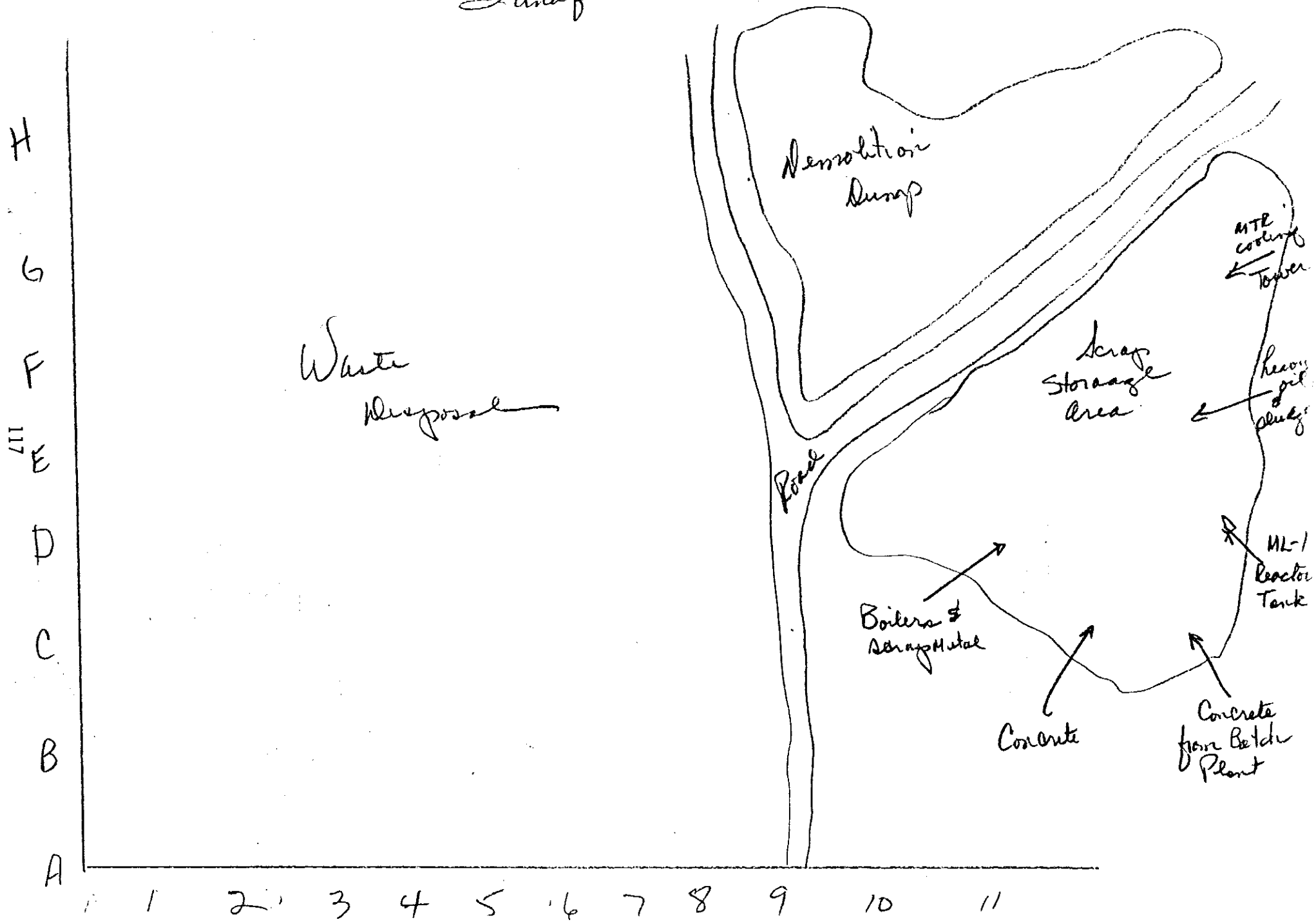
Question: Do you know of used oils used to control dust.

Fred: Yes, used oil was used on the dirt roads

Question: On a regular basis?

Fred: Yes, when the dust was a problem.

Landfill - 2


H
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Waste Disposal
Demolition Dump
Road
MTR Cooling Tower
Scrap Storage Area
Heavy oil plug
Boilers & Scrap Metal
ML-1 Reactor Tank
Concrete
Concrete from Batch Plant

Attachment 14

Subject: Memo of Conversation on past operations at CFA Landfill II and disposal of oil in the borrow pit at the east end of Lansing Blvd.

Date: November 4, 1993

Interviewer: Jim Crandall, EG&G Idaho, Inc.

Interviewee: Peter Depue, EG&G Idaho, Inc.

MEMO OF CONVERSATION

INTERVIEWER: Jim Crandall

REPRESENTING ORG: WAG-4 TIME: 8:30 AM: X PM: ___

INTERVIEWEE: Peter DePue S# 25323 DATE: 11/4/93

REPRESENTING ORG: F&M Heavy Equipment Operator.

SUBJECT: (1) Landfill #3 Operational Practices
(2) Landfill #2 Operational Practices
(3) Oil dumping site in ditch near east end of parking lot at the

SIGNATURE: Peter DePue

CONVERSATION: Question: How many trenches were used to fill Landfill #3?

Pete: I think 3 but it could have been more. Sometimes dozers had to move but could not dig trenches as wide as they were designed.

Question: When did you dispose asbestos?

Pete: I can't remember. There was the area at the north end of landfill #3. I think some of it was put there.

Question: Was any placed at Landfill 2?

Pete: I am it was but I don't remember where.

Pete Lee Page 2
(Cont)

MEMO OF CONVERSATION

11/4/93

CONTINUATION SHEET

CONVERSATION: Question: Did you ever burning tires at landfill #2 or #3?

Pete: No, we burned over at landfill #1 only.

Question: Do you know where the East Hole is located as it is refered to in the log books?

Pete: Yes, it was to the right of the entrance to landfill #3.

Question: What was disposed in the East Hole?

Pete: Most of it was concrete, some metal, and asphalt. Some dirt and gravel, too.

Question: Were any solvents and chemicals (powders or liquid) disposed in the landfills?

Pete: Some. I don't remember how much.

Question: Was it ever burned?

Pete: No just dump in the trench. Used oil was

Pete Knee
(Cont, page 3)

11/4/93

MEMO OF CONVERSATION

CONTINUATION SHEET

CONVERSATION: Interview and Discussion with Pete Knee (Control Landfill 2.

Question: What can you tell me about the dumping of used oil & sludge in the borrow pit and the end of Fencing it off?

Pete: It was done all the time. I would pick up the sludge using the 500 gallon tank and drive to the borrow pit Backing, and open the drain valve on the tank and let it run (until it was empty).

Question: What can you tell me about used oil being used to control dust?

Pete: Oil was used to control dust on the dirt roads at the INEL.

Question: Would you say about oil was used this way?

Pete: Yes, it was common Practice. How Much? I don't know.

Attachment 15

Subject: Memo of Conversation on past operations at CFA Landfill II and disposal of oil in the borrow pit at the east end of Lansing Blvd.

Date: November 4, 1993

Interviewer: Jim Crandall, EG&G Idaho, Inc.

Interviewee: Randy Drage, EG&G Idaho, Inc.

MEMO OF CONVERSATION

INTERVIEWER: Jim Crandall

REPRESENTING ORG: WAG 4 TIME: _____ AM: ___ PM: ___

INTERVIEWEE: Randy Drage S# 34868 DATE: _____

REPRESENTING ORG: F&M Heavy Equipment Operator

SUBJECT: (1) Landfill #2 - Questions about actual operations during the use of the landfill.
(2) Oil dumping site in ditch near the east end of Tansing St at C7a

SIGNATURE: [signature]

CONVERSATION: Question: Was open burning performed in Landfill #2.

Randy: Not that I can recall. The only open burning was in Landfill #1. It was in the incinerator and in the trenches.

Question: Was Waste oils, sludges solvents disposed in the Landfill #2.

Randy: Yes

Question: On a regular basis or occasionally?

Randy: On a regular basis.

Question: Do you know of any waste oils, sludges, or

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Randy Krage (Cont) page 2

MEMO OF CONVERSATION

CONTINUATION SHEET

CONVERSATION: solvents disposed or placed in the trench or borrow pit at the east end of Lansing Station?

Randy: Yes, sludge and used oil was dumped there all the time.

Question: Do you know when?

Randy: I think in the 1960's. Ask Pete DePue, he ran the "acid tank".

Question: What is the acid Tank?

Randy: It was a 500 gallon tank used for oils, sludges, etc. I think it was used at one time as an acid tank and the name stuck with it. This Tank was hauled around the INEL by one of the chain trucks.

Question: Anything else that might of gone into the borrow pit?

Randy: The painters from CF654 dumped stuff in there also.

Question: Do you know of oils being used as

Randy Drage (cont) page 3

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MEMO OF CONVERSATION

CONTINUATION SHEET

CONVERSATION: dust control?

Randy: Yes, the used oil was spread on the dirt roads to control dust.

Question: How much?

Randy: All the time during the summer & fall.